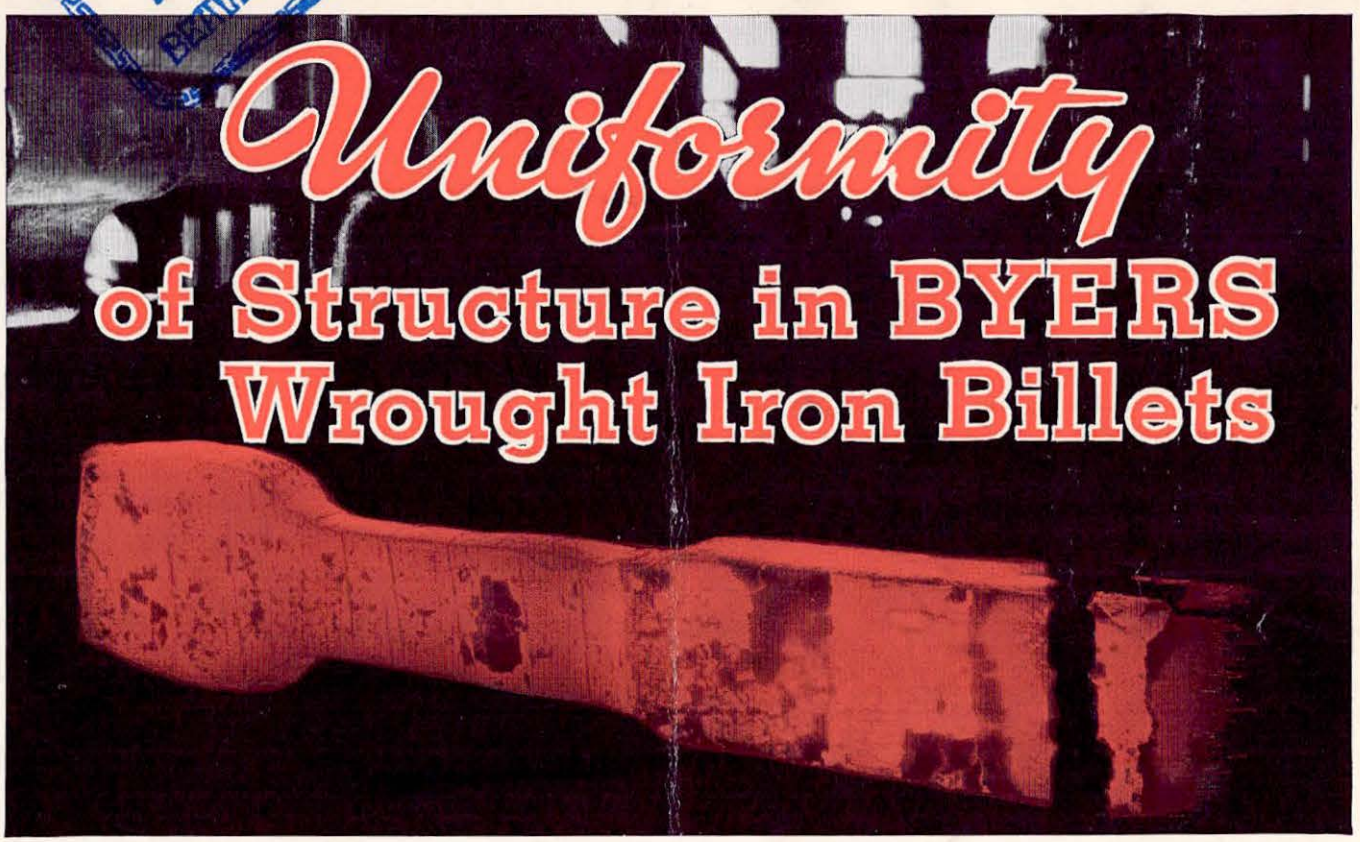
APRIL 29, 1933

Railway Age

FOUNDED IN 1856



This photograph taken in a large eastern railroad shop shows Byers Genuine Wrought Iron Billet being forged into locomotive draw-bar.

● Railroad men know what they can expect from Byers Genuine Wrought Iron. After all, it has been a railroad standby for sixty-nine years!

Now, available in forging billets, the use of Byers Wrought Iron is extended even further into railroad service. It possesses just those qualities of strength, toughness, fatigue resistance and uniformity of structure that makes it desirable for modern railroad fabricating and service requirements. In fact, every Byers Forging Billet is the result of definite chemical, metallurgical and mechanical control assuring a uniform structure of excellent quality.

Ask for a copy of the illustrated, descriptive bulletin —"Byers Genuine Wrought Iron Billets."

A Byers Engineer will gladly furnish you with complete data on Byers Genuine Wrought Iron Forging Billets which are furnished in all desired sizes, thus eliminating an extra amount of forge shop work. Telephone the nearest Byers office or write our Engineering Service Department at Pittsburgh.

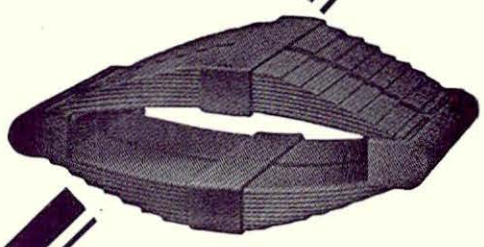
A. M. Byers Company, Established 1864. Pittsburgh, Boston, Philadelphia, New York, Chicago, St. Louis, Houston, Los Angeles.

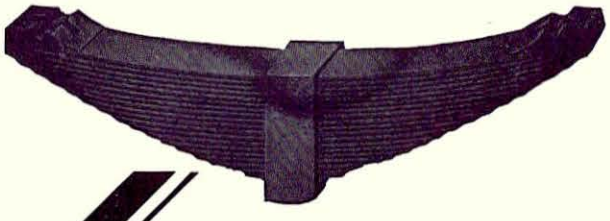
BYERS GENUINE WROUGHT IRON PRODUCTS

PIPE · CASING · COUPLINGS · NIPPLES · WELDING FITTINGS · BLOOMS · RIVETS
SPECIAL BENDING PIPE · BAR IRON · TUBING · PLATES · SHEETS · BILLETS · STRUCTURALS

STANDARD of QUALITY for 69 YEARS · · · TODAY BETTER THAN EVER

Merely Keeping Busy Is Not Good Business





THE reclamation of springs in railroad shops may keep a few men busy but it costs much more than sending broken springs to us for repair. This keeping busy is often bad business.

Few railroads have sufficient volume in tonnage to justify the purchase of the equipment needed to rework and heat treat old springs and make them equal to new. Few shops can keep workmen so busy on springs that they become really expert. Only a big spring organization can perform research work and advance with the art of spring making.

The repair of broken springs should receive the same skillful attention as the manufacture of new ones. Much of the misalignment of locomotive equalizing mechanisms is due to poor and non-uniform springs. Without adequate equipment, skilled labor, a volume in tonnage and a complete, well-rounded organization it is impossible to repair springs properly and economically.

Send Your Springs To Us For Repairs

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Railway Steel-Spring Company

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Reduce Hump Yard Costs with G-R-S Electric Car Retarders

The 18 hump yards that have been equipped with G-R-S Retarders during the past few years have conclusively demonstrated the great facility and economy of car-retarder operation as indicated by the following statements from a recent report of the A. R. A., Signal Section.

"Decreased yard costs 40 per cent; cut time of cars in receiving yard 50 per cent. Net annual saving in excess of 50 per cent on investment."

"Materially expedited traffic at busy Chicago Terminal."

"Saved in excess of $160,000 per year. Reduced yard cost 27.5 per cent."

"In addition to the actual saving that without question is effected in cost of classifying cars by use of the retarder, we must add the saving that would be necessary for a larger facility to handle the peak business if car rider operation were in use."

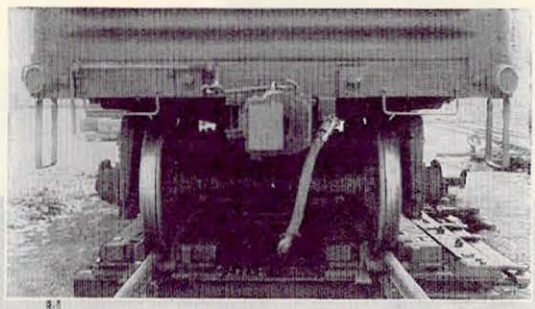
"Approximate annual saving of $145,000 brought about by retarder operation. Increase of 14 per cent in number of cars humped per hour."

"Capacity of yard increased 50 per cent by the installation of retarders, which will permit additional saving with any increase in business."

"Saved 13 cents per car in direct costs of classification."

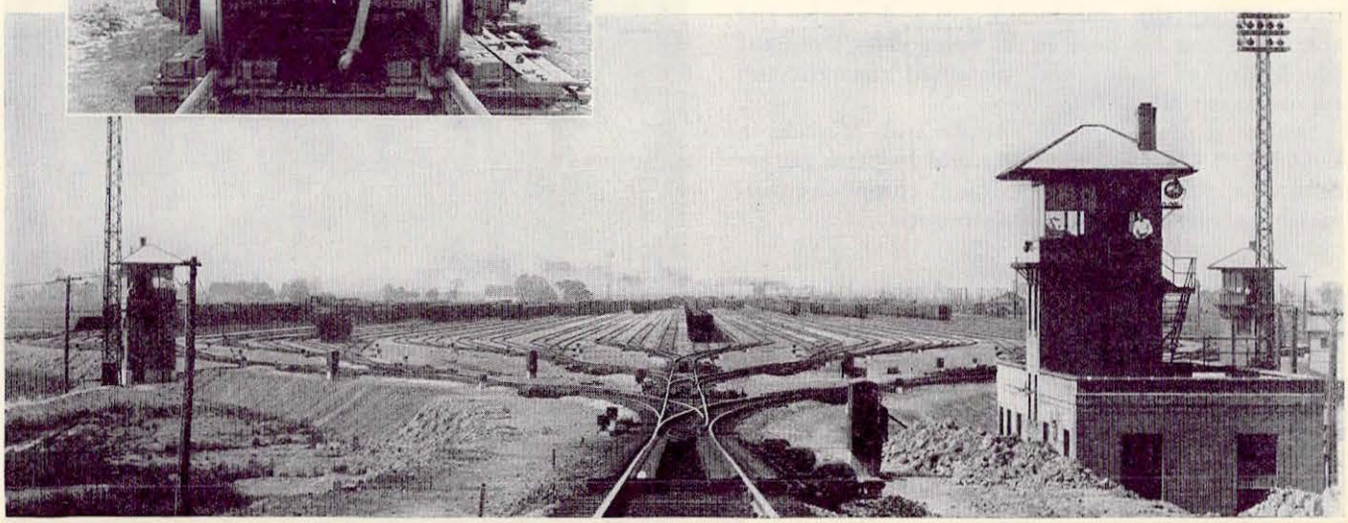
"New retarder equipped yard afforded greatly improved facilities for handling freight car classification. Reduced flat switching at other yards."

The G-R-S Retarder System is entirely electrical which means simplicity and economy in operation and maintenance. Let us show you how car retarders would reduce your hump yard costs.



GENERAL RAILWAY SIGNAL COMPANY

ROCHESTER, N. Y. A-1152



YOU CAN NOW SPECIFY TONCAN IRON FOR LARGE SECTIONAL PIPE . . .

REG. U.S. PAT. OFF.
TONCAN
IRON CULVERTS

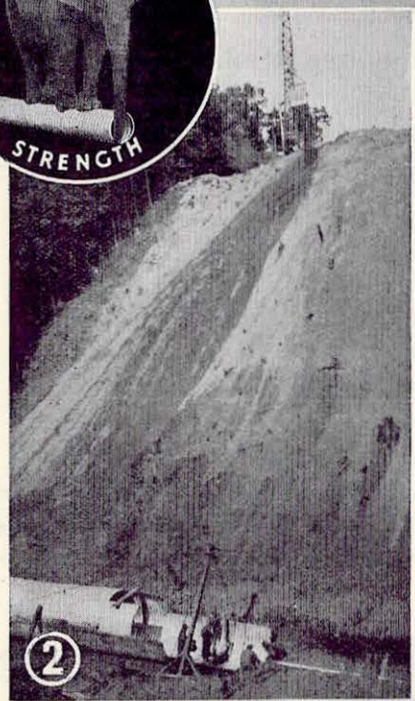
ENDURANCE
STRENGTH

The satisfactory service given by Toncan Iron in standard culverts all over the country created a widespread demand for large diameter sectional plate pipe made of the same material. Members of the Toncan Culvert Manufacturers' Association are now in a position to meet the demand. Already a number of such installations have been made and reports from the field indicate that this pipe meets every requirement.

Plates are accurately trimmed, corrugated, curved and punched. Construction in the field is rapid. Inexperienced labor can erect it easily. Transportation charges are low because it is shipped knocked-down. And because the metal is Toncan Iron, it is economical in service.

Twenty-five years of development—of metallurgical research, experimenting, testing and practical proving—is the background of Toncan Iron. During this time it has evolved from a commercially pure well-made iron to a modern alloy of scientifically refined iron, copper and molybdenum. Today it ranks first among the ferrous metals in resistance to rust after the stainless irons and steels, and acknowledges no peer in its price class from the standpoint of endurance, sustained strength and resistance to vibration.

Sectional plate pipe of Toncan Iron is made in sizes 60 to 150-inch diameter and in plate gauges to meet specifications. Prices and complete information gladly furnished upon request.



1 *Completing work on 185 feet of 90-inch, 3-gauge Toncan Iron Sectional Plate Pipe near Romulus, New York.*

2 *Starting the erection of 225 feet of 90-inch, 3-gauge Toncan Iron Sectional Plate Pipe near Hates Corners, New York.*

3 *Showing completion of 225 feet of Toncan Iron Sectional Plate Pipe near Hates Corners, New York.*

Gentlemen: Please send complete facts about Toncan Iron Culverts.

Name .....

Address .....

Railroad ..... *Position* .....

TONCAN CULVERT MANUFACTURERS' ASSOCIATION
YOUNGSTOWN, OHIO

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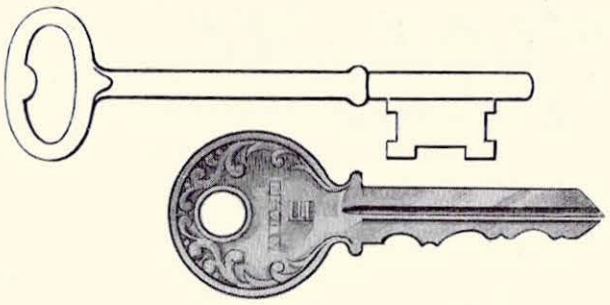
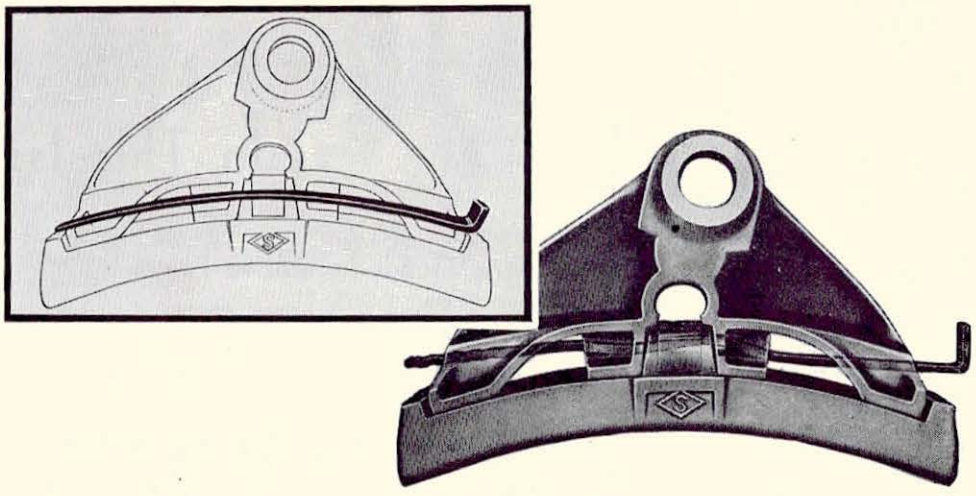




THERE IS A *difference* IN KEYS

THERE are numerous kinds and shapes of keys and they all have a definite purpose—to lock—to make something secure.

The new brake shoe LOCKEY with its four points of contact will, when applied to a new brake head, hold the head and brake shoe so firmly together that motion between the two is prevented and the life of the brake head is definitely prolonged.

It will also prevent the loss of brake shoes due to chattering brakes or on car dumpers.

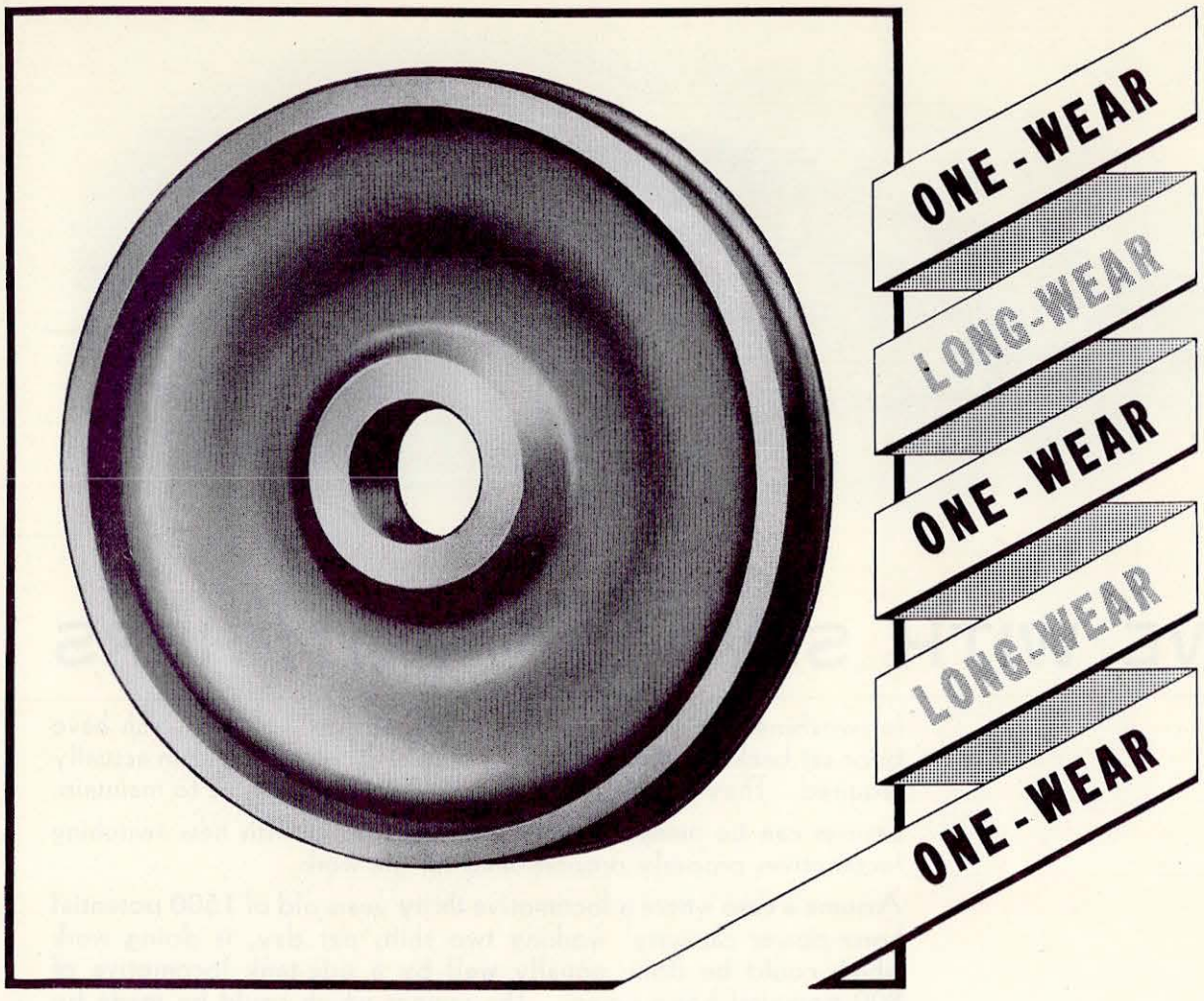
The standard A. R. A. brake shoe key will not do these things.

The LOCKEY used in conjunction with a Diamond "S" brake shoe will result in substantial savings.

The American Brake Shoe and Foundry Company

230 Park Avenue, New York

332 So. Michigan Avenue, Chicago



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But You'll Say They Are
LONG-WEARS

WE had to call them One-Wear wheels, but they are really more than that. According to experienced wheel buyers, Wrought Steel One-Wears are the longest-wearing wheels they have ever used for light, speedy equipment. They should know; for plus-mileage is something they can figure, something they can see. That sort of stamina is consistently built into Armco One-Wear Wheels . . . . Always the finest quality steel, the same degree of hardness below the condemning limit as above, the same dependable margin of safety. Consider the economies of Armco Wheels before you buy again. The office nearest you will gladly assist in solving your wheel problems. Write.

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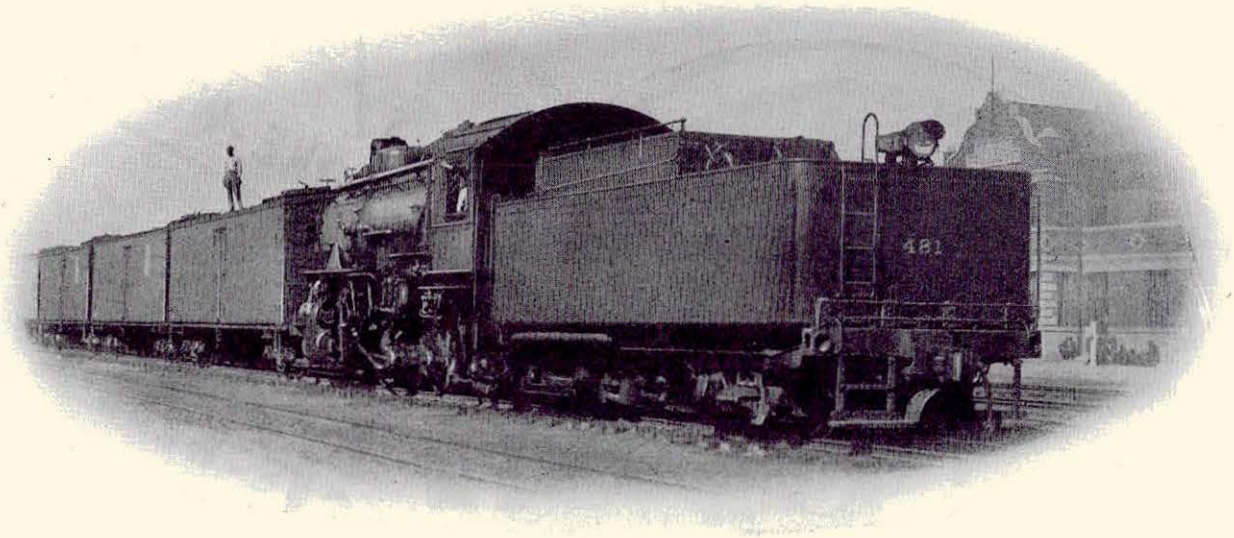


SAVE WITH SMALLER SWITCHERS

In switching service, many of the old road locomotives which have been set back have much greater potential horse-power than actually required. They are expensive to operate and expensive to maintain.

Savings can be made by replacing such power with new switching locomotives properly proportioned for the work.

Assume a case where a locomotive thirty years old of 1500 potential horse-power capacity, working two shifts per day, is doing work which could be done equally well by a side-tank locomotive of 800 potential horse-power. The savings which could be made by retiring the old locomotive and replacing it with a new switcher of smaller capacity, would be about as follows:

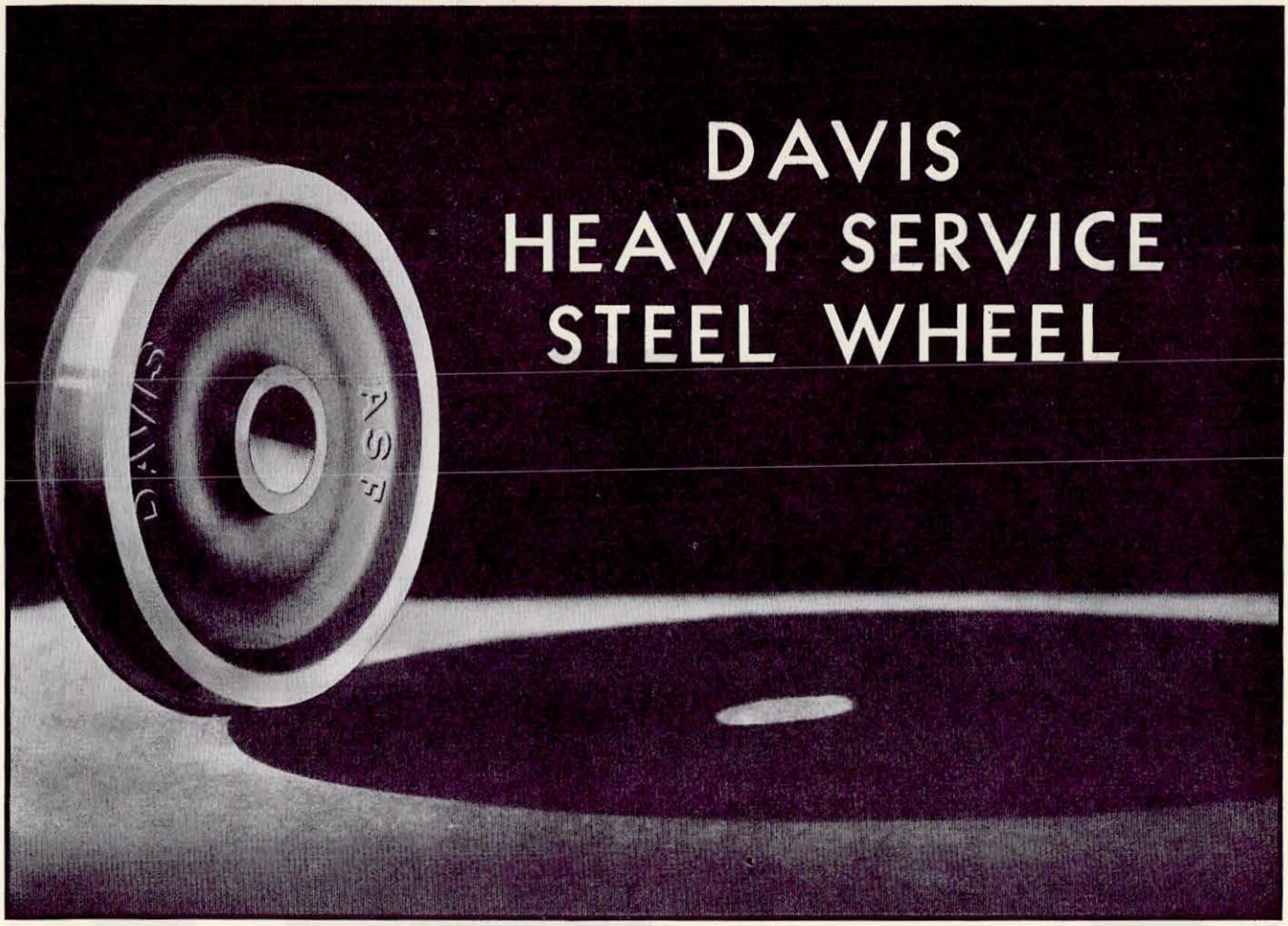
	Cost Per Hour of Operation	
	Old Locomotive 1500 H. P.	New Locomotive 800 H. P.
Fuel	$0.70	$0.50
Wages	5.63	5.63
Lubrication	.04	.03
Other Supplies	.03	.03
Water	.014	.008
Enginehouse Movements	.37	.37
Repairs	1.63	.19
Totals	$8.40	$6.76
Savings per hour		$1.64
Savings for first year		$8,134.00

Such savings in maintenance and operating expenses would pay for the new locomotive within comparatively few years and leave a substantial margin of increased earnings.

It takes Modern Locomotives to make money these days!

THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA



A WHEEL FOR HEAVY HIGH SPEED TRANSPORTATION

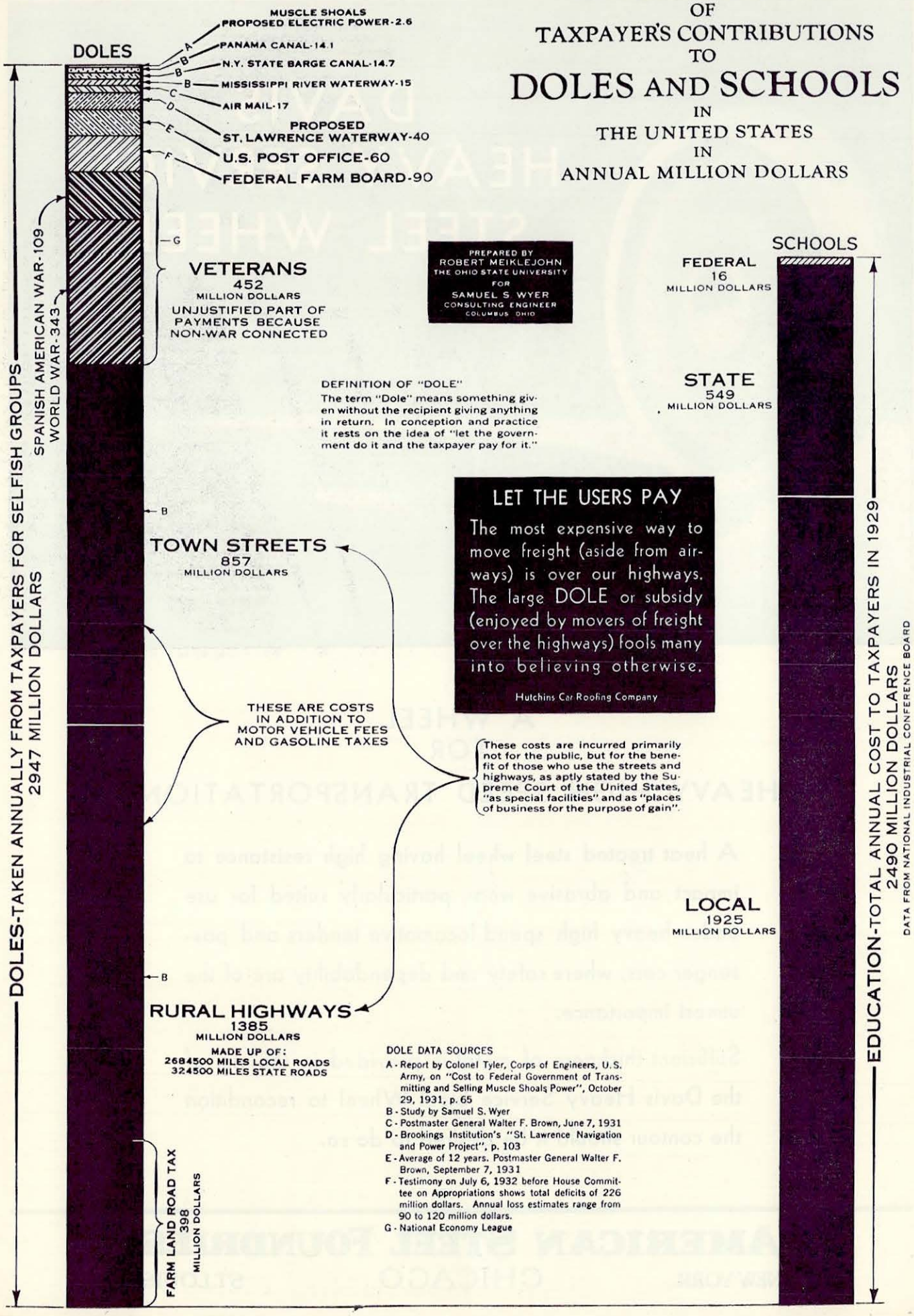
A heat treated steel wheel having high resistance to impact and abrasive wear, particularly suited for use under heavy high speed locomotive tenders and passenger cars, where safety and dependability are of the utmost importance.

Sufficient thickness of metal is provided in the rim of the Davis Heavy Service Steel Wheel to recondition the contour should it be desired to do so.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

COMPARISON
OF
TAXPAYER'S CONTRIBUTIONS
TO
DOLES AND SCHOOLS
IN
THE UNITED STATES
IN
ANNUAL MILLION DOLLARS



PREPARED BY
ROBERT MEIKLEJOHN
THE OHIO STATE UNIVERSITY
FOR
SAMUEL S. WYER
CONSULTING ENGINEER
COLUMBUS OHIO

DEFINITION OF "DOLE"

The term "Dole" means something given without the recipient giving anything in return. In conception and practice it rests on the idea of "let the government do it and the taxpayer pay for it."

LET THE USERS PAY

The most expensive way to move freight (aside from airways) is over our highways. The large DOLE or subsidy (enjoyed by movers of freight over the highways) fools many into believing otherwise.

Hutchins Car Roofing Company

These costs are incurred primarily not for the public, but for the benefit of those who use the streets and highways, as aptly stated by the Supreme Court of the United States, "as special facilities" and as "places of business for the purpose of gain".

DOLE DATA SOURCES

A - Report by Colonel Tyler, Corps of Engineers, U.S. Army, on "Cost to Federal Government of Transmitting and Selling Muscle Shoals Power", October 29, 1931, p. 65
B - Study by Samuel S. Wyer
C - Postmaster General Walter F. Brown, June 7, 1931
D - Brookings Institution's "St. Lawrence Navigation and Power Project", p. 103
E - Average of 12 years. Postmaster General Walter F. Brown, September 7, 1931
F - Testimony on July 6, 1932 before House Committee on Appropriations shows total deficits of 226 million dollars. Annual loss estimates range from 90 to 120 million dollars.
G - National Economy League

RAILWAY AGE

Business Improvement and Proposed Legislation

Many of those who have been thinking of ways to end the depression, or looking for evidence that it is drawing toward a close, recently have been concentrating their attention on developments in Washington and in the stock and grain markets. What, meantime, has been the trend of general business? The best single measure of the country's total volume of production and commerce is the number of railway cars loaded with freight, and car loadings since the termination of the general banking moratorium have indicated an upward trend in general business.

As the *Railway Age* has heretofore pointed out, the trend of car loadings was steadily downward from October 1, 1929, to about the end of July, 1932. After July, 1932, the trend changed upward, and general business reached a higher level, on which it stayed until the end of February, 1933. In February, 1932, car loadings were 24 per cent *less* than in July, 1931, while in February, 1933, they were 1 per cent *more* than in July, 1932. There is a wide difference between a trend which carries business downward 24 per cent, and a trend which, in a corresponding period, prevents it from declining at all. The banking moratorium suddenly set business back in March, 1933, to relatively as low a level as it reached in July, 1932. Ever since then loadings of freight have been steadily increasing again. In the week of the banking moratorium they were less than 438,000 cars, or 24 per cent less than in 1932. In the three weeks ending April 15 they averaged 492,033 cars, or only 10 per cent less than in 1932. Average weekly loadings in the first three weeks of April, 1932, were 25 per cent less than in the preceding July, while in the first three weeks of April, 1933, they were 1.6 per cent greater than in July, 1932, when the bottom of the depression was reached.

Evidences of Improvement

The price of wheat (July option) on April 13, 1932, was 66⅞ cents, and declined in July, 1932, to 44¼ cents. On December 24, 1932, it was 43⅜ cents. On April 22, 1933, it reached 71 cents. The average price of railroad stocks on July 8, 1932, as reported by Dow-Jones, was 13.23, and of industrial stocks, 41.22. The market subsequently anticipated an improvement in business, because on September 3, 1932, the rail average had advanced to 49.27, and the industrial average to 78.33. Just when general business began to show substantial improvement, however, security prices began to decline, evidently owing to the general banking and financial situation, and on March 2, 1933, immediately before the general banking moratorium, the average price of railway stocks was only 23.94 and of industrial stocks 52.54. Owing to the termination of the general banking moratorium, to subsequent and prospective improvements in business, and no doubt in considerable measure to the talk of inflation, the average for railway stocks had increased on April 22 to 30.66, the highest figure since October 4, and for industrial stocks to 72.24, the highest figure since September 28.

Because of the number of banks that have remained closed and the amount of money impounded in them, there probably has been no actual inflation since the banking moratorium, but there has been much talk of inflation, and unquestionably this has stimulated advances in the prices of commodities and securities. There is something more substantial than talk of inflation, however, in the increases of carloadings that have been occurring. There is also something more substantial than talk of inflation in the fact that on April 22 automobile output and steel production had increased for four consecutive weeks. These are all evidences of increases in physical production and commerce.

The available evidence indicates that economic readjustments that had been made caused general business to begin to turn upward last fall, that this upward trend was arrested by the drain on the banks and finally by the banking moratorium, but that it was resumed as soon as the banking situation was improved and Congress passed the "economy" bill. Stock market prices have not yet advanced to as high a level as they reached in September, but as their advance last summer was due entirely to prospective improvement in business, it would appear that recent advances in the prices of both stocks and commodities also have been due quite as much to actual and prospective improvement in business as to talk of inflation; and such improvement in business as has been occurring has been

made in spite of the tendency of such proposals as those for six-hour day legislation to retard improvement.

Mob Psychology and Business Leadership

In view of the fact that the general trend of business has been decidedly better for almost eight months than it was before, in spite of serious retarding influences, many students of economics and business must seriously question the expediency of numerous kinds of legislation which are being advocated in Washington as essential to economic revival. Take the railway situation, for example. Legislation to co-ordinate railway service and thereby effect economies needed in the present emergency is desirable, especially if it is to be accompanied by legislation to repeal the recapture provisions and liberalize the provisions of the Reconstruction Finance Corporation law to enable railways of good earning capacity and sound financial structures to borrow more money from the government. The main thing needed, however, to relieve the railway emergency is an increase of traffic and earnings, and the one thing that is essential to an increase in their traffic and earnings is an improvement in general business. As general business actually is improving, although slowly, it is difficult not to regard with concern rather than hope such radical proposals as legislation for the general establishment of a six-hour day in industry and transportation, and for inflation of the currency rather than for expansion of credit.

Measures to establish a six-hour day at eight hours' pay seem much more likely to protract the present emergency by arresting the revival of business and increasing unemployment than to have the opposite effects. It was contended forty years ago, during the depression of the nineties, as it is contended now, that inflation by the free coinage of silver, at a ratio of 16 to 1, or even by the issuance of fiat paper money—in other words, by reduction of the value of money—was imperatively needed to increase prices, reduce the burden of indebtedness and thereby restore prosperity; but legislation to reduce the value of money was not adopted, and business did revive, prices and the value of property did increase, most debtors did become able to meet their obligations, and the country entered a long period of prosperity. It cannot be emphasized too strongly or too often that, as to the railroads in particular, and as to business in general, we are dealing with two different problems. One is the problem presented by the present emergency. The other is the problem of making prosperity real and lasting after business revives. There is great danger that in dealing with an emergency such as the present one most persons will lose their heads and become willing to support any measure that promises immediate relief, in complete disregard of its probable later and more lasting effects.

Probably no people ever allowed their supposed thinking to be so completely dominated by mob psychology as the American people have within recent years. Only four years ago the mob mind believed that we were in a "new era" in which the value of real estate and other property, and the prices of common stocks, could never cease to advance. This was exactly the same thing, although few persons knew it, as believing that the value of money could never cease to decline. Now the mob mind believes exactly the opposite—viz., that the value of money will never decline again, and the value of property as measured in money will never increase again, without legislation to compel depreciation of money. The prevalence of this new mob psychology, which is the exact opposite of that which prevailed only four years ago, could not be better illustrated than by the fact that many persons are now disposed to favor, or are actually advocating, when business is slowly improving, legislation which less than a year ago, when business was still declining, they would have opposed as unsound and highly dangerous.

The duty of solving both the economic problems of the emergency, and the economic problems of the future, rests upon business leaders as well as upon leaders in public affairs. Most business leaders completely abdicated their duty four years ago by encouraging mob psychology instead of resisting it. Business men will not do their duty to themselves, to their stockholders, or to their country now unless they resist the prevailing mob psychology, keep their heads cool and their feet on the ground, and resolutely and courageously oppose emergency measures which might be temporarily stimulating, but which subsequently might defeat all efforts to establish and maintain prosperity.

The Weight of Rail

Much attention has been given during recent years, and properly so, to the trend toward the use of heavier rails. One road after another has announced the adoption of larger sections. Year after year the statistics of rail production show larger proportions of heavier patterns. All of these developments lead very naturally to the impression that we are rapidly removing light rail from main tracks. However, it is well to check the facts.

In its compilation of statistics for the year 1931, which has just been issued, the Interstate Commerce Commission shows that on December 31 of that year only 13.2 per cent of main tracks were laid with rail of 110 lb. section and heavier, whereas 17.5 per cent of the mileage was equipped with rail of lighter than 75 lb. section. Again, only 32.6 per cent of the main track mileage was of 100 lb. section and heavier, as compared with 43.2 per cent lighter than 90 lb. Furthermore, with all of the tonnage of 130 lb. and even of 152 lb. sections that has been laid, the average weight of rails in all main tracks 15 months ago (and for all practical purposes, of this date as well) was 91.29 lb. This figure, however, represents an increase of 5.0 lb. in the last five years and of 10.66 lb. in the last 10 years.

These figures are not without significance. In the

first place, the increase in the weight of rail in track has been sufficient to bring about a change in the conditions prompting the determination of rail sections. Until within the last decade maintenance engineers were largely of the conviction that their track construction was not keeping pace with the demands placed on it by heavier locomotives and larger cars, and they were urging use of heavier rails primarily for reasons of safety. Recent increases in section have largely overcome this fear, however, and in its place there has entered a new consideration—that of maximum economy of maintenance. It was this motive that led the Kansas City Southern to undertake its extended investigation of two years ago which led to the conclusion that a 137 lb. section was the most economical for its main tracks.

This is a line of approach to the determination of the most desirable rail section that is still largely undeveloped. Yet it is one of basic importance to the determination of the most economical design of track structure. If the Kansas City Southern study and the conclusions drawn from it are reasonably accurate, and no one has yet refuted them, the rails now in service on practically every railway of the country are far lighter than considerations of ultimate economy would dictate. This is a subject of vast importance to the railways, and to the steel companies as well, especially when so many practices are being devised to reduce the deterioration and increase the service life of rail after it has been laid.

Motor Transport Regulation Needed Now

Legislation for federal regulation of interstate motor carriers, according to reports from Washington, is not included in the Administration's program for the present special session of Congress, but will be postponed for consideration at the regular session which convenes in January. With full sympathy for the government in the terrific volume of business which it has to despatch and the plain urgency of much of it, we nevertheless believe that to postpone the regulation of highway transport would be a grave mistake. The problems it gives rise to grow more serious as time goes on.

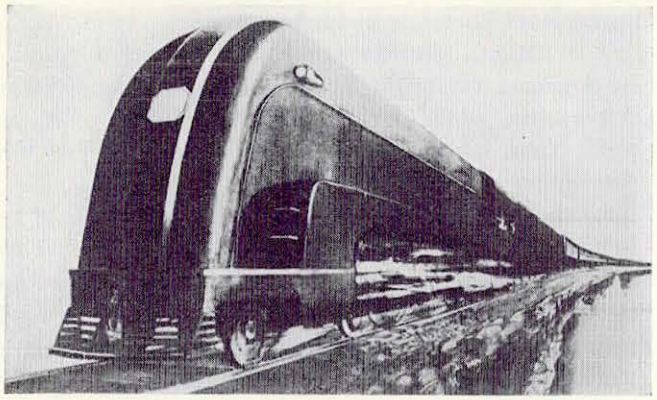
Railway employees, in particular, have every reason earnestly to hope that the reported program of the government may be revised and that this long-needed legislation may be enacted now. The proposed railway legislation, insofar as can be learned, is mainly aimed at improving railroad credit. Important as this is, it can benefit employees only indirectly by the stimulation to general business which improved railroad credit would entail. Railway employees, however, we believe, have a right to expect more than that from their government. They have a right to ask that the undermining of their jobs by "sweated" motor transport labor working twelve hours a day and more shall cease here and now. Proposals are seriously discussed for enforcing a general six-hour day throughout industry. It would be more logical first to eliminate the 12-hour and even the 16-hour day of which many instances could be cited in unregulated interstate motor transport.

The nation's greatest problem is the relief of unemployment. It might be argued that no net gain in employment would result from the transfer of some traffic from highway to rail, which would follow the elimination of unjustified motor transport expansion, since the jobs railway employees would gain would be balanced by those that truck drivers would lose. This does not follow, however, since if general observation can be relied upon, most truck drivers in over-the-road transport are, by their long hours, doing two men's work. If their hours were limited, as they should be by reasonable regulation, the volume of long-distance trucking could diminish greatly without any decline in the number of drivers. Moreover, regulation of highway transportation at an early date ought to expand the activities of the Interstate Commerce Commission sufficiently to provide jobs for some at least of its employees whose services otherwise will be dispensed with if reported administrative reforms are carried out.

There might, it is said, be disagreement about legislation of this character which would unduly occupy the attention of Congress when it has many serious questions before it requiring prompt action. It is true that there would be some disagreement. There always is on the part of those who benefit by unjust conditions and wish to continue to do so. We believe, however, that intelligent public men will readily appreciate the near unanimity which bona fide transport leaders have achieved on the proposals for legislation, and will discount an opposition engineered largely by interests whose sole concern is the sale of their products to one branch of the transport industry.

It is true that the aim is, quite properly, to confine the special session of Congress to emergency legislation, but a situation is no less an emergency and hence needful of prompt attention because it has developed over the years rather than in the space of a few weeks. Federal regulation of interstate motor transport is long overdue. Congress and other governmental agencies have been studying it for years and hence are far better informed on the subject than they are upon many measures upon which they are being asked speedily to act. Indeed, it is quite probable that action would have been had long since had not the requisite leadership been lacking in one branch of Congress. That obstacle is now removed. The government is now a harmonious unit and at the head of it stands a man who in the address he delivered in Salt Lake City last September showed an understanding of the fundamentals of this problem which is probably not excelled by that of any other man prominent in public life. We believe if railroad men can show the governmental authorities at Washington how seriously they feel that this legislation is needed now, that their views will receive sympathetic consideration.

Modern Trends in Motive Power*



How characteristics have changed since 1905—Light locomotives of modern design needed for secondary services—Higher speeds will require streamlining

By William C. Dickerman

President, American Locomotive Company

MOTIVE power characteristics depend to a large degree upon the conditions surrounding railway operation. During the past five years you have seen marked changes in these conditions and in the demands for railway service.

Shippers' requirements, along with highway competition, have forced railway managements to alter the character of service given to the public for many years. Huge inventories are no longer necessary; hand-to-mouth buying is the order of the day. Deliveries of materials for manufacturing purposes are now made with sufficient despatch to insure prompt completion of finished product. Overnight shipments are now accomplished where days were formerly needed, so that even under the adverse business conditions existing for the past three or four years we find definite departures from previously accepted standards in railway operation, and this is reflected in the design of the motive power that performs the service.

Evolution Since 1904

The locomotive that gave the highest horsepower per axle of any freight unit tested at the St. Louis Exposition in 1904 registered a maximum indicated horsepower of 275 per driving axle. It was of the Consolidation type, which was then the conventional freight machine.

The trend toward greater boiler capacity and higher horsepowers in freight service manifested itself previous to 1915 and the 2-8-2 type began to be used in large numbers about that time. As higher speeds were established in freight service and still greater boiler capacity demanded, the 4-8-2 type came into general freight service about 1920 to 1925. Here again another pair of wheels was added to the Mikado type, this time at the front end. Within the past five to seven years a large number of locomotives of the 2-8-4 type have been constructed for both moderate and fast freight service. The latest development in which another pair of truck wheels is used, making a four-wheel truck at front and a four-wheel truck at back, still with four pairs of drivers, is the high-speed freight locomotive of today.

The ten-wheel passenger locomotive so commonly used about 1905 later developed into the Pacific, or 4-6-2 type, in general use about 1915. The Pacific type was the logical successor to the Ten-wheeler for the same reason that the Mikado succeeded the Consolidation. The demands on the boiler necessitated the use of the trailer wheel. This was further developed into a higher capacity Pacific type with booster about 1925. The locomotive booster came into being about the year 1918 and is now in use in this country to a large extent for the purpose of providing better starting of passenger equipment, the improvement of tonnage ratings on non-momentum grades, and a bettering of freight schedules. The latest development is that of the Hudson, or 4-6-4, for very high-speed service on roads where grade conditions do not demand a higher starting tractive force than can be obtained with three pairs of driving wheels, with or without booster.

Many other types of locomotives were used during this period for both freight and passenger service, but the general trend of this development is about as I have indicated.

Trends in Characteristics

Fig. 1 shows the general trend based upon actual test figures of representative locomotives as to indicated horsepower per axle and percentage of weight on drivers. It does not represent maximum performance entirely; it does show tendencies.

The freight service of 1905 was slow. Freight locomotives were designed to haul maximum tonnage at low speed. Today, we still have a limited amount of freight handled in the same manner, but for the past few years the tendency has been toward higher speeds in this

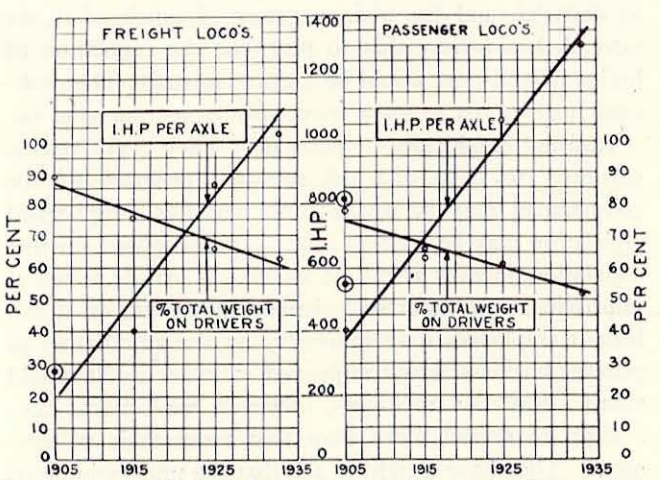


Fig. 1—Trend of Indicated Horsepower in Relation to Weight of the Steam Locomotive

* Abstract of a paper presented before the New York Railroad Club, April 21, 1933.

service. Since 1923 the average speed of freight trains in this country has increased 42 per cent. We must have adequate starting tractive force, but equally important is the capacity of the boiler to maintain these schedules at high speeds. Without increasing to a prohibitive figure individual weights on driving wheels, this enlarged boiler capacity must be carried on trucks.

The average weight per driving axle of the freight locomotives tested at the St. Louis Exposition was about 43,000 lb. Today, it might be considered as being around 60,000 to 65,000 lb., or perhaps a 50 per cent increase. The horsepower per axle has increased during this time close to 300 per cent.

A similar condition exists as to passenger locomotives. The trend line shows an average of about 300 to 400 hp. per axle in the early 1900's and today we are exceeding 1,200 hp. per axle; likewise, the percentage of weight on driving wheels to total weight is decreased from approximately 75 per cent to about 55 per cent.

In the upper part of Fig. 2 the lower lines show the capacity of the Consolidation locomotive previously referred to; the upper lines represent a modern high-speed freight locomotive with the same number of driving axles. These are actual test curves, not theoretical.

In the lower half of the figure similar information is plotted for the most powerful passenger locomotive tested at the Exposition compared with one of our modern high-speed locomotives. The great increase in horsepower indicated on this plate can be attributed to no one major improvement, but probably two of the important factors were the introduction of the high temperature superheater and the mechanical stoker about the year 1910, both of which are in general use today on all high-capacity units.

In Fig. 3 we have in diagrammatic form an illustration of the trends from 1905 to the present day in connection with steam characteristics. The first division gives the trend in boiler pressures. This line is based only on the conventional type of radial-stay boiler and does not include anything but single-expansion locomotives.

For several years a boiler pressure of around 200 lb. per sq. in. was practically standard. Along about 1920 the tendency was to increase the pressures and that tendency has continued until we have a number of locomotives today running at 300 lb. pressure per sq. in. and one instance of 325 lb. Practically the same trend is noticed abroad, although they have exceeded what has been done in this country. Locomotives in Germany are running with a pressure of 356 lb. per sq. in. with radial stay boilers.

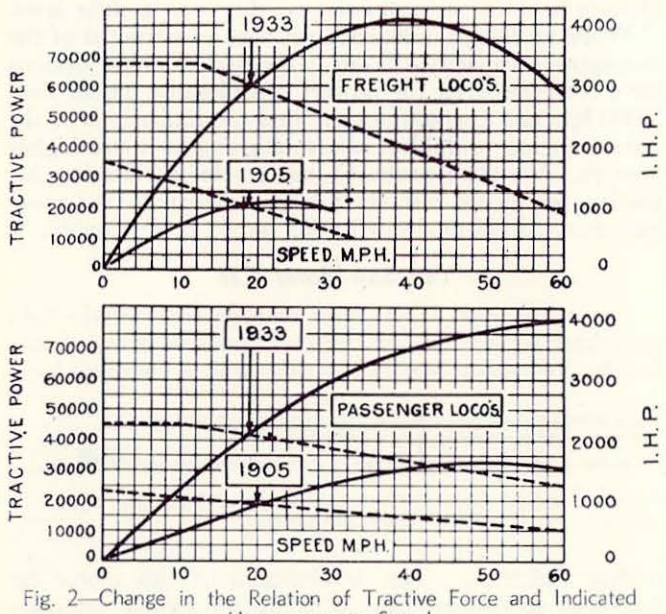


Fig. 2—Change in the Relation of Tractive Force and Indicated Horsepower to Speed

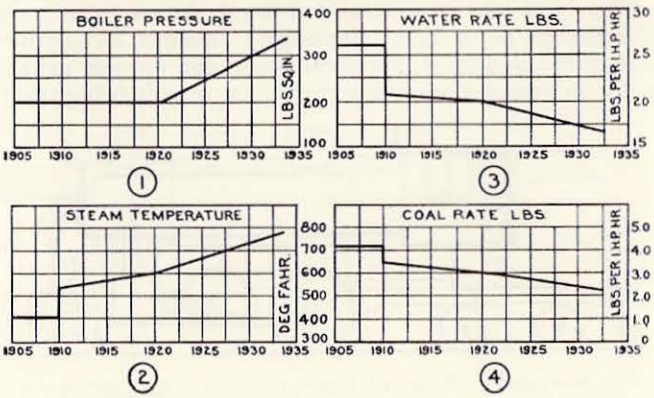


Fig. 3—Trend in the Steam Characteristics

The second division of Fig. 3 shows the trend in steam temperatures. Up to 1910 the superheater had not been used to any extent in this country. About that time its application was begun in earnest and since then steam temperatures have gradually increased. Today the superheater is standard equipment.

The third section illustrates the decline in water rate in pounds per indicated horsepower-hour and the fourth section, the decline in the coal rate. For the saturated steam period up to 1910, these lines have been based upon the averages obtained on the single-expansion locomotives tested at St. Louis.

Availability Has Increased

No trend line is shown for thermal efficiency. It is difficult to do this without opening the door to considerable argument. Steam locomotive thermal efficiencies have increased materially during the past few years up to a maximum of about 14½ per cent in the condensing locomotive. Thermal efficiency, however, is not the only measure of locomotive performance. In too many cases maximum thermal efficiencies reported are taken at speeds which do not occur but for a small percentage of the time.

Of equal importance is what I might call the serviceability factor. We have passenger locomotives today running as high as 20,000 miles in a single month. We have one example of a passenger locomotive making 96,000 miles in six months. This locomotive has a high serviceability factor and it was not in the enginehouse a large percentage of its time—it was out making money for the railroad. There are freight locomotives in this country making as high as 10,000 miles in a month; locomotives that for every dollar spent either in first cost, maintenance or fuel are yielding handsome returns. It isn't far back that a freight locomotive making 3,000 miles a month was doing a wonderful job.

A Modern Locomotive for Light Passenger Service

Passenger locomotives are running from 150,000 to 200,000 miles between shoppings. There are cases even better. Freight locomotives are running from 100,000 to 150,000 miles between shoppings. While the trend is constantly toward higher thermal efficiency, lower steam and coal rates, we have not forgotten that along with these accomplishments the locomotive must spend most of its time doing actual work for the railroad.

We have had considerable interest shown recently in the design of a light, thoroughly modern locomotive, illustrated in Fig. 4, for local passenger service, principally on branch lines where the service now is being taken

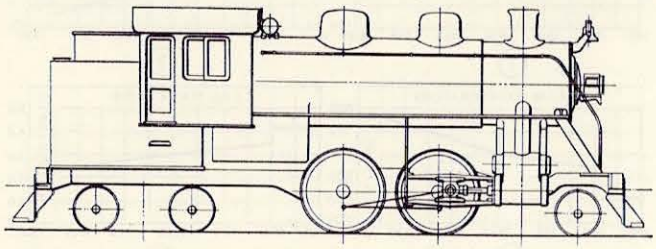


Fig. 4—Proposed Design of Steam Locomotive for Light Local Passenger Service

care of by obsolete former main-line passenger locomotives. Here is a design that will handle these light trains on present operating schedules and do it at minimum cost. It is not intended for long runs or for very high speed. Railways in Europe have long since realized the advantages in the use of light, modern suburban locomotives and they find it to their interest to give just as careful consideration to the design of this class of power as they give to their main-line units.

As far as efficiency is concerned, such a machine would compare with the best main-line locomotives of today; it would operate at high pressure with high temperature steam; its parts would be light; its maintenance would be low, and it would use existing passenger cars.

Diesel-Electric Locomotives

Within the past few years the Diesel-electric locomotive has made for itself a definite place in the transportation scheme. At the present time this field is limited, due to the higher first cost of the Diesel locomotive as compared with steam of equivalent power, but as the use of these units becomes more general, designs will be further standardized, particularly as regards the engine and transmission, resulting in lower first costs and a great widening in the field of operation.

Fig. 5 illustrates a 600-hp. locomotive designed for switching service and with a weight all on driving wheels of about 100 tons. Having electric drive on all wheels, it provides greater tractive force for starting purposes than is possible with the same weight on drivers of a steam locomotive. It is equipped with a cab on one end similar to a steam locomotive, the engine and generator being placed under the hood but entirely separated from the operator's cab. The engine is a six-cylinder solid injection type, running at 700 r. p. m.

This arrangement has worked out very satisfactorily as it provides excellent vision in either direction and keeps the attention of the operator directly upon only those duties that he is supposed to perform.

One of these locomotives in heavy switching service in a nearby yard recently ran for 24 hours at a total fuel cost of less than $6.00. Another, also in switching service, has averaged 23 hours per day for 300 days in a year.

While over 100 Diesel locomotives have been placed in service so far in this country, most of them are doing switching work. The bulk of these are between 300 and 600 hp. A few of higher horsepower have been constructed and used in both switching and light road service.

Perhaps, at this time there is very little justification for a Diesel locomotive of high horsepower, but we find considerable interest on the part of our railroad friends.

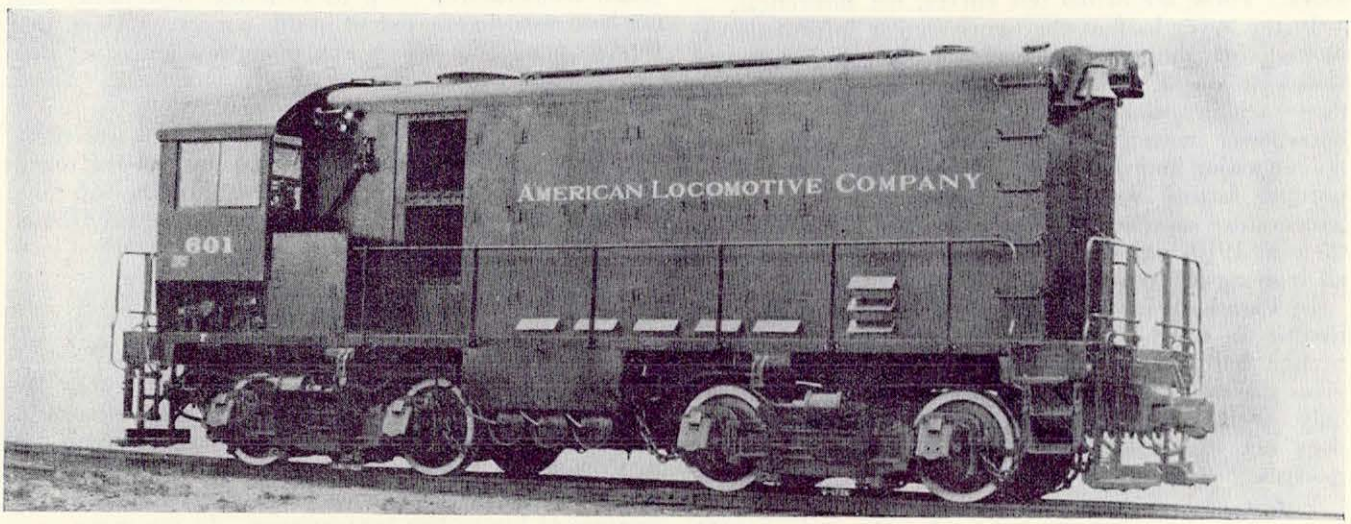


Fig. 5—A 600-Hp. Diesel-Electric Switching Locomotive

There is more than a possibility that there will be a definite field for a locomotive of this type a little later.

While no Diesel units have yet been constructed of the horsepower capacity of our large steam units, designs have been prepared for powers considerably higher than 2,000 hp., and I would not say that the limitations of the Diesel engine prohibited us from going to these higher powers. We shall probably find ample justification for motive power of this class where otherwise the more expensive complete electrification would be demanded.

The Rail-Motor Car

For many years it has been realized that certain light passenger service on our railways could be economically handled by motor cars rather than with a complete loco-

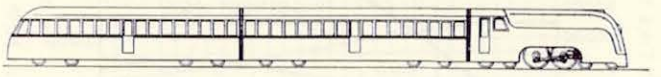


Fig. 6—Proposed Streamlined Locomotive and Train for Light Fast Passenger Service

motive and train. The development of this motor car has been interesting and it is by no means yet com-

pleted. Steam units were introduced in small numbers a few years ago, but were largely discarded in favor of the internal combustion type, although recently there have been several efforts made to revive the oil-burning high-pressure steam motor car.

The greater percentage of cars in operation use either gasoline or distillate and the Diesel engine, while used abroad to a greater extent for this service, has not yet made much headway in this country. As in the case of the locomotive, so will we Dieselize the motor car when the service is sufficiently intensive to justify it. It would seem as though we had perhaps stepped a little too far with the gasoline or distillate engine and that the use of the Diesel engine in some of these recent motor cars would have resulted in further economies.

Perhaps one reason for this situation is the fact that up until a few years ago there was no satisfactory Diesel engine for railway operation. Today that condition does not exist.

The Streamlined Locomotive and Train

We all know of passenger trains of 8 to 10 cars carrying 75 to 100 passengers. The weight of such a train, exclusive of locomotive and tender, would run to about 600 to 800 tons. Add the weight of the locomotive and tender required to haul it at the essential high speed of today and the total weight of such a train goes to more than 1,000 tons.

A 10-car Pullman train weighs approximately 800 to 850 tons behind the tender. A saving of 20 per cent in the weight of these cars would represent, at 70 miles an hours, a saving of 400 hp. in the locomotive. Convert all this into savings in first cost, in fuel consumption and in maintenance, not only of the locomotive and tender but also of tracks, bridges and such. It becomes obvious that serious effort must be made to accomplish something in this matter of weight reduction.

Higher speeds will undoubtedly be necessary in order to meet the wishes of the public. Curvature conditions in many places now demand their due respect, but unquestionably our routes have many long stretches where higher speeds can be maintained with an ample margin of safety. Within the past two years this tendency toward higher speeds has been demonstrated both here and abroad. In England the "Cheltenham Flyer" on June 6, 1932, ran its 77¼ miles from start to stop in 56 min. and 47 sec. In France, one run of 148¾ miles is scheduled at 2 hr. 15 min. The Canadian railroads now maintain some of the fastest long-distance trains in the world. Our New York and Chicago limited trains now operate on materially reduced schedules.

Steam motive power can meet this issue of speed, but it can do it more economically and with the present degree of safety if car weights can be substantially reduced.

Fig. 6 shows, in outline, a suggestion for a high-speed steam train for daylight use. Its capacity, depending on the comfort and service demanded, might be 50 to 100 passengers. Both locomotive and train, from pilot to observation platform, would be highly streamlined. The metal cars would be considerably lighter than those now commonly used; they would be comfortable from the standpoint of riding qualities, and they probably would be air-conditioned.

The locomotive, with two driving axles and large diameter wheels, would use high-pressure, superheated steam and would be modern in every respect. It would be capable of speeds of 90 miles an hour or better; its parts would be very light and easily cared for, and its maintenance cost would be low. The first cost of such a train would not be prohibitive and its operating costs would certainly be much below the costs of carrying an equal number of passengers in a train of today. It is not intended for a local run nor for heavy traffic, overnight runs, but is meant for long-distance runs without intermediate stops.

You may say that this is a little daring. But isn't this what we need? Essentially, it is nothing but a modification of the Berlin to Hamburg two-unit car having steam as the motive power. It can be drawn by steam or internal combustion power as conditions warrant.

If we are to increase the speed of our passenger trains materially and with the best known economy, it will be necessary to streamline. We may not like the appearance but we are going to like it—since the new lines will gain enough to make them well worth while. Wind-tunnel tests, both in this country and abroad, have proved definitely that a streamlined locomotive and train, with proper vestibule connections between cars and some attention to rear-end air currents, will reduce the wind resistance by 20 to 30 per cent.

Here is a means of reducing the horsepower required to attain high speeds. It is calculated, and I think with a high degree of accuracy, that one of our high-speed passenger locomotives running at 80 miles an hour requires 200 to 300 more horsepower than it would if it were streamlined. If the public desires the higher speeds, then we must carry the public in a conveyance with the characteristics shown [at the beginning of this article].

What Designs Now Available Will Accomplish

Motive power expenses have been unusually high during the past seven or eight years for several reasons. First, the cost of maintenance, per unit of work done by the locomotive, increases steadily with advanced age. Secondly, the terminal efficiency of the modern locomotive has been so greatly improved over that of the power units built prior to ten years ago that large fuel economies are now obtainable by the use of new locomotives, as compared with those now experienced with the existing inventory. And, finally, there is a large and growing demand for high speed freight service—quite aside from passenger service—which can be met economically and effectively only with motive power having adequate boiler and engine capacity and large driving wheels, all designed to pull heavy loads at high speeds. Practically none of the locomotives built more than ten years ago are competent to perform this service.

During the five-year period from 1927 to 1931, as has been shown in summaries setting forth installations of new locomotives year by year during a 20-year period, the indicated turnover in tractive force was but once in 73 years. It is obvious that the railroad industry cannot prosper upon the use of a locomotive inventory over 50 per cent of which is wholly obsolete and only about 17 per cent of which is truly modern. The present situation is due in small part only to the depression of 1930 and 1931 or later. It has, in fact, been developing for many years.

The railroads, in recent years, have not been unmindful of the degree of obsolescence, but with the continued reductions in revenue arising from a reduced volume of business their first attention had to be addressed to conserving their cash resources. They are today, I believe, looking to a planned turnover of locomotive inventory as a mechanism for controlling operating expenses and for increasing net operating income.

We know that economies in operation due to the use of the modern power at this moment available represent, in some cases, savings of 20 to 40 per cent annually on the investment.

C. & E. I. To Reorganize Under New Bankruptcy Law

THE Chicago & Eastern Illinois on April 18 petitioned the United States district court at Chicago for authority to reorganize under the recently enacted emergency bankruptcy legislation. Judge John P. Barnes, in granting the carrier's petition, authorized the present management to operate the property. In its order, the court allowed the company until June 15 to file a statement of assets and liabilities as of April 18. Later the carrier will submit to the court a plan of reorganization which must be approved by the creditors, bondholders and stockholders.

Maturing Obligations Total $1,568,010

In its petition, the railroad stated it is unable to meet debts as they mature and desires to effect a plan of reorganization pursuant to the recent act of Congress. The maturing obligations which the carrier listed as being unable to meet on May 1 and which total $1,568,010 are (1) interest on secured notes, aggregating $28,591; (2) taxes on property subject to penalty if not paid by May 1, approximating $651,904; and (3) interest on obligations, which constitute a lien on the property, of $887,515.

The Chicago & Eastern Illinois operates 939 miles of lines extending from Chicago to Evansville, Ind., and to St. Louis, Mo., with a line to Chaffee. About 57 per cent of its freight traffic consists of products of mines and of this 57 per cent, 46 per cent is bituminous coal, the decrease in shipments of which in recent years has seriously affected both gross and net revenues of the railroad.

Tonnage of bituminous coal handled has steadily declined from 7,168,247 in 1926 to 4,149,060 in 1930, 2,996,455 in 1931 and 2,916,236 in 1932. The railway's coal traffic has been adversely affected by the loss of business by the highly unionized mines of Southern Illinois and Indiana to the non-union mines of Kentucky and West Virginia. This loss has been accentuated by the depression in business as well as by the mild temperatures which prevailed during the last two winters in the territories served by the railroad. In addition, trucking operations have deprived the company of increasing tonnages of coal moving to points in the vicinity of the mines. These conditions were continued and, in some instances, accentuated in 1932, resulting in the further decline in revenues from this commodity.

The remaining traffic handled by the railroad is classified between manufactures and miscellaneous products, 20 per cent; products of agriculture, 14 per cent; products of forests, 4 per cent; animals and products, 2 per cent; and l. c. l. traffic, 3 per cent. The total revenue freight tonnage of the railroad has shown a steady decline from 14,467,954 in 1926 to 7, 332,867 in 1931 and 6,314,846 in 1932. The freight revenue has correspondingly fallen from $21,414,226 in 1926 to $11,856,112 in 1931 and $9,819,161 in 1932.

Previous Reorganization in 1920

The present railroad is the outgrowth of a reorganization in 1920 of a road of a similar title. The present company has never paid a dividend on either preferred or common stock and operated at a loss after all charges of $7,549,263 in 1930, of $3,957,539 in 1931 and of $3,767,645 in 1932. In 1932 the company reported a net operating deficit of $1,283,337. The nearest maturity is a $2,789,000 consolidated mortgage of 6 per cent, due October 1, 1934.

The Reconstruction Finance Corporation is a large creditor of the railroad, having loaned it approximately $6,000,000, for which it accepted prior lien bonds as collateral.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended April 15 amounted to 494,215 cars, an increase of 6,919 cars as compared with the week before but a reduction of 72,611 cars as compared with the corresponding week of last year. Miscellaneous freight, which includes the new beer traffic, showed an increase of 7,859 cars as compared with the week before, and grain, forest products, and ore showed small increases, while the loading of merchandise, coal and coke, showed reductions. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week Ended Saturday, April 15, 1933

Districts	1933	1932	1931
Eastern	111,543	134,402	177,355
Allegheny	89,104	114,396	155,849
Pocahontas	34,312	35,470	42,590
Southern	82,864	86,626	121,025
Northwestern	58,342	64,116	87,306
Central Western	74,165	85,048	108,085
Southwestern	43,885	46,768	67,284
Total Western Districts	176,392	195,932	262,675
Total All Roads	494,215	566,826	759,494
Commodities			
Grain and Grain Products	33,857	31,854	39,641
Live Stock	15,113	20,145	22,024
Coal	78,792	94,356	110,947
Coke	3,166	4,065	6,382
Forest Products	16,765	20,014	34,096
Ore	2,536	4,321	7,418
Merchandise L. C. L.	160,523	186,945	225,373
Miscellaneous	183,463	205,126	313,613
April 15	494,215	566,826	759,494
April 8	487,296	545,623	737,272
April 1	494,588	544,961	727,852
March 25	475,850	561,118	738,880
March 18	449,712	584,759	741,253
Cumulative total, 15 weeks	7,185,778	8,448,239	10,868,876

The freight car surplus on March 31 amounted to 681,203 cars, a decrease of 9,858 cars as compared with the number at the middle of the month. This included 362,236 box cars, 244,242 coal cars, 33,225 stock cars, and 14,239 refrigerator cars.

Car Loading in Canada

Car loadings in Canada for the week ended April 15 amounted to 30,136 cars, or 2,234 cars less than for the previous week. The holiday on Good Friday affected the loadings to some extent, but after adjustment the index number rose from 56.55 to 57.34.

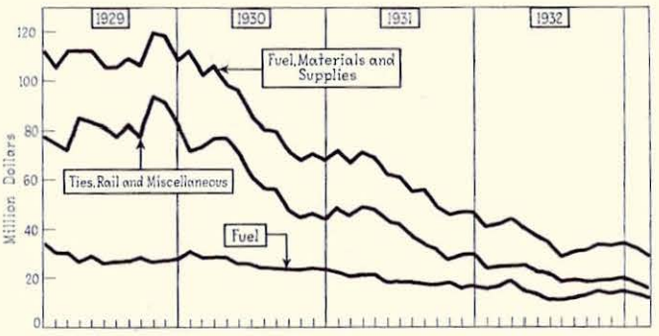
	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
April 15, 1933	30,136	17,382
April 8, 1933	32,370	17,885
April 1, 1933	34,584	18,016
April 16, 1932	41,509	21,637
Cumulative Totals for Canada:		
April 15, 1933	493,305	257,520
April 16, 1932	618,274	325,247
April 11, 1931	702,872	419,222

Railway Purchases in 1932 at Low Ebb

Final estimates show a reduction of approximately 80 per cent in purchases for repair and replacement since 1929

BECAUSE of the unprecedented reductions which have been made in the consumption of materials and supplies by the railroads and the belief that the purchases made by the railroads in 1932 would establish a low record which would often be referred to in years to come, the *Railway Age* has made a special effort to develop authoritative figures for that year. Its final estimate of total purchases is based on special reports from railroads collecting 92 per cent of the operating revenues of the Class I roads last year. It places the expenditures made for fuel and materials and supplis in 1932 at approximately $445,000,000, as compared with a preliminary figure, presented in our issue of January 7, of $441,500,000.

This sum, which excludes expenditures for new locomotives and car and also any materials supplied by contractors for construction work, as well as expenditures made for heat, light, water, electric power, etc., was approximately $250,000,000 or 36 per cent less than was



Railway Purchases by Months, January, 1929, to March 1, 1933

Table I—Railway Purchases—1932*

	Fuel	Ties	Other Material	Total	Total, Less Fuel
January	$17,500,000	$2,400,000	$21,600,000	$41,500,000	$24,000,000
February	17,900,000	2,400,000	23,100,000	43,400,000	25,500,000
March	18,300,000	3,900,000	23,300,000	45,500,000	27,200,000
April	15,000,000	4,000,000	21,800,000	40,800,000	25,800,000
May	14,000,000	3,200,000	21,300,000	38,500,000	24,500,000
June	11,950,000	3,300,000	20,150,000	35,400,000	23,450,000
July	10,750,000	2,350,000	15,300,000	28,400,000	17,650,000
August	12,600,000	1,940,000	17,660,000	32,200,000	19,600,000
September	13,400,000	2,400,000	16,700,000	32,500,000	19,100,000
October	15,600,000	1,940,000	17,660,000	35,200,000	19,600,000
November	14,900,000	1,490,000	18,410,000	34,800,000	19,900,000
December	15,100,000	1,490,000	20,310,000	36,900,000	21,800,000
	$177,000,000	$30,810,000	$237,290,000	$445,100,000	$268,100,000
January†	14,600,000	1,890,000	16,210,000	32,700,000	18,100,000
February†	13,500,000	2,300,000	13,800,000	29,600,000	16,100,000

* Estimated from special reports to *Railway Age*.
† Data for January and February, 1933, subject to revision.

Table II—Purchases of Materials and Supplies, 1932

	1932					1931
	Fuel	All Ties	Rail	Other Material	Total	Total
Alton	$860,773	$383,086	$105	$960,174	$2,204,138	$3,425,661
A. T. & S. F.*	8,282,001	831,825	1,471,645	8,173,926	18,759,412	27,880,543
A., B. & C.	136,584	41,616	.....	353,094	531,296	830,635
A. C. L.	2,558,847	465,984	692,440	3,570,740	7,288,021	9,711,720
B. & O.	4,737,956	228,955	.....	5,887,740	10,854,651	19,870,333
Bang. & Aroos.	404,683	115,555	176,640	386,810	1,083,687	1,586,169
B. & A.	1,967,145	131,276	200,356	1,301,326	3,600,114	.....
B. & M.	2,868,368	767,978	39,946	3,553,738	7,230,042	10,107,947
C. of Ga.	807,277	41,395	.....	697,390	1,546,071	2,780,725
C. of N. J.	2,349,652	218,676	.....	1,594,659	4,162,985	6,687,379
C. Vt.	.....	.....	.....	.....	1,105,798	1,458,459
C. & O.	2,839,239*	422,182†	668,261	4,274,983	8,204,672	17,589,551
C. & E. I.	811,737	128,151	120,635	646,376	1,706,899	2,090,085
C. & I. M.	93,966	26,730	682	182,850	304,234	532,157
C. & N. W.	5,469,092	810,456	.....	5,255,708	11,535,452	18,062,211
C., B. & Q.	4,605,921	462,794	454,044	5,325,309	10,848,085	16,556,311
C. G. W.	1,386,637	373,136	63,470	1,077,361	2,900,613	3,945,470
C. M., St. P. & P.	5,494,804	2,356,026	601,124	6,264,345	14,716,301	18,432,413
C., R. I. & P.	5,374,349	158,880	.....	4,016,745	9,549,981	15,020,866
C., St. P., M. & O.	1,698,535	100,728	90,344	1,109,249	2,998,866	3,681,007
C. & G.	26,393	44,832	23	83,617	154,873	220,534
D. & H.	1,749,666	716,448	210,845	2,604,972	5,281,944	7,683,818
D., L. & W.	2,226,980	114,856	405,695	3,938,843	6,686,374	8,569,892
D. & R. G. W.	1,037,754	475,422	56,917	1,160,509	2,730,602	4,221,105
D., T. & I.	176,607	535	256	176,699	354,099	694,067
D., M. & N.	83,921	78,378	.....	421,033	583,343	1,954,439
E., J. & E.	457,519	66,069	13,190	258,813	795,600	1,907,546
Erie	3,937,376	532,474	1,392,701	6,026,460	11,889,026	16,665,096
F. E. C.	387,135	93,241	.....	413,510	893,901	890,785
G. N.	4,338,722	1,090,723	634,704	3,582,828	9,646,987	15,727,550
G. C. and I. G. N.	893,593	97,408	21,969	1,578,203	2,591,546	5,606,333
Ga. & Fla.	.....	.....	.....	.....	193,513	303,319
I. C.	4,997,746	1,405,309	580,665	7,102,627	14,086,347	22,437,913
K. C. S.	613,575	63,832	.....	672,419	1,349,832	1,946,007
L. S. & I.	605	13,101	42	16,005	29,753	172,624
L. & N. E.	197,300	42,653	74,067	258,162	527,182	590,169
L. & A.	120,157	66,500	.....	232,310	418,979	870,885
L. & N.	2,886,985	564,005	898,613	4,329,699	8,659,317	12,783,762
M. & St. L.	518,310	109,319	54	523,064	1,150,259	1,834,449
M. St. P. & S. S. M.	1,843,908	257,022	.....	2,119,653	4,220,586	5,990,415
M. & N. A.	.....	.....	.....	.....	169,077	261,818
M-K-T.	1,013,336	124,017	125,659	1,338,201	2,601,214	3,532,469
M. P.	4,246,675	1,140,145	287,052	5,143,671	10,817,556	16,797,601
M. & O.	498,558	200,390	.....	511,632	1,210,590	1,503,651
Montour	55,345	14,983	21,658	135,861	227,847	370,065
N. C. & St. L.	655,276	245,842	.....	960,103	1,961,229	3,289,856
N. N.	.....	.....	.....	.....	91,522	157,707
N. Y. C. Lines	.....	.....	.....	.....	38,544,045	63,517,302
N. Y. C. & St. L.	2,108,240	176,540	375,810	2,105,811	4,766,401	6,458,949
N. Y., O. & W.	.....	.....	.....	.....	1,753,772	.....

* Not including foreign-line freight.
† Cross ties.
‡ Forest products.

Table II—Purchases of Materials and Supplies, 1932 (Continued)

	1932					1931
	Fuel	All Ties	Rail	Other Material	Total	Total
N. Y. N. H. & H.	$1,133,418	$715,348‡	$4,709	$4,287,342	$6,140,832	$13,664,193
N. P.	4,105,149	365,972	175,874	3,935,765	8,582,760	13,858,891
Nw. P.	216,077	53,629‡	.....	122,974	392,670	505,971
Penna. & L. I.*	.....	.....	.....	.....	50,584,959	72,760,605
P. M.	1,059,029*	379,990†	.....	926,768	2,365,791	5,581,458
P. & S.	.....	.....	.....	.....	152,580	124,340
P. S. & N.	53,210	37,096	1,593	61,373	153,284	195,459
P. & W. Va.	47,576	961	2,192	121,225	171,951	433,147
Read.	.....	.....	.....	.....	7,006,791	12,247,777
Rutland	397,215	142,160	21,003	269,061	829,439	1,052,377
St. L.-S. F.	2,361,474	413,400	42,766	2,825,243	5,642,883	6,626,627
St. L. Sw.	.....	.....	.....	.....	1,291,709	1,755,795
S. A. L.	1,949,982	409,929	.....	2,713,945	5,073,856	10,132,184
Sou.	4,300,771	2,584,336	135,318	5,976,158	12,996,623	19,862,658
S. P.	6,569,608	980,648‡	631,674	4,919,939	13,101,869	22,417,049
S. P. & S.	442,645	43,450	.....	340,868	826,963	1,111,965
T. C.	89,398	25,723	.....	127,035	242,157	506,380
T. & N. O.	1,064,471	268,814	385,605	1,755,527	3,474,429	6,889,163
T. & P.	898,566	113,753	11,712	1,546,645	2,570,694	4,590,682
U. P.	9,657,524	892,953	4,308	8,030,236	18,585,035	32,438,572
Virginian	.....	.....	.....	.....	1,434,491	2,075,814
Wab.	2,499,000	245,750	978	2,275,155	5,020,883	7,916,013
W. Md.	635,000	191,000	287,000	939,506	2,052,506	2,506,911
W. P.*	917,482	41,409†	26,700	781,664	1,767,255	4,644,338
W. & L. E.	285,000	28,300	.....	465,718	779,018	1,360,983

* Not including foreign-line freight.
† Cross ties.
‡ Forest products.

spent in 1931, $593,000,000 or 57 per cent less than was spent in 1930, and approximately $885,000,000 or 67 per cent less than was spent in 1929. The proportionate reductions in expenditures for new equipment and construction were much greater.

Based on reports from over 80 per cent of the roads,

Table III—Purchases of Fuel, Materials and Supplies by Class I Railways of the United States—1924 to 1932, Incl.

Item	1932	1931	1930	1929	1928	1927	1926	1925	1924
Fuel	$178,250,000	$244,500,000	$306,500,000	$364,392,000	$384,608,000	$438,821,000	$473,354,000	$459,465,000	$471,656,000
Forest products	52,200,000	76,250,000	134,600,000	157,551,000	160,794,000	175,729,000	186,291,000	170,305,000	180,872,000
Iron and steel products	100,550,000	202,100,000	329,700,000	437,840,000	397,544,000	432,604,000	507,302,000	419,255,000	365,610,000
Miscellaneous	114,000,000	172,150,000	167,700,000	369,752,000	328,395,000	348,774,000	392,085,000	343,018,000	324,917,000
Grand total	$445,000,000	$695,000,000	$1,038,500,000	$1,329,535,000	$1,271,341,000	$1,395,928,000	$1,559,032,000	$1,392,043,000	$1,343,055,000
Per cent of operating revenue	14.1	16.8	20.2	21.8	20.8	22.8	24.4	22.7	22.7

Table IV—Purchases of Materials and Supplies by Class I Roads of the United States—1932*

	1932	1931	1930	1929
Fuel:				
Coal	$146,550,000	$204,000,000	$249,050,000	$296,371,000
Fuel oil	29,200,000	36,750,000	53,600,000	62,132,000
All other	2,500,000	3,750,000	3,850,000	5,889,000
Total fuel	$178,250,000	$244,500,000	$306,500,000	$364,392,000
Forest Products:				
Cross ties (treated and untreated)	$27,550,000	$44,000,000	$75,500,000	$83,421,000
Switch and bridge ties (treated and untreated)	4,250,000	7,500,000	9,150,000	10,642,000
Timber and lumber	18,100,000	21,500,000	43,550,000	55,002,000
Other forest products	2,300,000	3,250,000	6,400,000	8,486,000
Total forest products	$52,200,000	$76,250,000	$134,600,000	$157,551,000
Iron and Steel Products:				
Steel rail (new and second-hand, except scrap)	$15,500,000	$41,500,000	$75,000,000	$94,195,000
Wheels, axles and tires	18,250,000	26,500,000	32,700,000	41,269,000
Frogs, switches, crossings, track fastenings and bolts, spikes, tie plates, rail anchors, etc.	18,500,000	32,750,000	53,700,000	70,971,000
Iron bridges, turntables, structural steel, bar iron and steel, forgings, fabricated and unfabricated shapes, and pressed steel parts	7,800,000 [1]	25,200,000	39,200,000	57,330,000
Flues and tubes for locomotive and stationary boilers	1,700,000	4,650,000	6,200,000	7,194,000
Telegraph and telephone, interlocking and signal material	6,000,000	13,500,000	25,000,000	30,878,000
Bolts, nuts, washers, rivets, springs, etc.	3,950,000	9,500,000	14,800,000	20,272,000
Locomotive and car castings, beams, couplers, frames and car roofs	19,400,000	27,750,000	47,500,000	65,086,000
Machinery, boilers, repair parts and all other iron and steel products	9,450,000 [2]	20,750,000	35,600,000	50,645,000
Total iron and steel products	$100,550,000	$202,100,000	$329,700,000	$437,840,000
Miscellaneous:				
Cement	$1,750,000	$4,950,000	$5,100,000	$7,628,000
Lubricating oils and grease; illuminating oils, boiler compound; waste	14,300,000	15,500,000	18,200,000	24,328,000
Metals and metal products	11,250,000 [3]	20,800,000	41,500,000	57,497,000
Ballast	9,300,000	6,850,000	18,500,000	23,750,000
Air-brake material and appliances for locomotives	5,150,000	11,750,000	18,000,000	25,043,000
All electrical materials	5,250,000	13,750,000	14,700,000	17,641,000
Stationery and printing	14,400,000	18,500,000	20,300,000	25,567,000
Supplies for dining cars and restaurants	8,500,000	19,750,000	21,500,000	28,899,000
Rubber and leather goods	2,950,000	4,500,000	7,500,000	9,657,000
Painters' supplies and chemicals	13,700,000	14,500,000	26,800,000	35,985,000
Train and station supplies and miscellaneous	27,450,000 [4]	41,300,000	75,600,000	113,757,000
Total miscellaneous	$114,000,000	$172,150,000	$267,700,000	$369,752,000
Grand total	$445,000,000	$695,000,000	$1,038,500,000	$1,329,535,000

* Data for 1930, 1931 and 1932 compiled by *Railway Age*; data for 1929 by Bureau of Railway Economics. Figures include foreign-line freight.
[1] Includes $1,400,000 pressed and structural steel; $4,050,000 bar and light sheet steel; $2,350,000 locomotive and car forgings.
[2] Includes $1,700,000 springs for cars and locomotives; $1,000,000 steel plate; $3,150,000 track tools, cars and parts; $3,600,000 machinery, tenders, locomotive frames and miscellaneous.
[3] Includes $5,950,000 castings and tubings of brass and other alloys; $2,000,000 pipe and fittings; $3,300,000 nails, hand tools and other hardware.
[4] Includes $4,750,000 miscellaneous building materials; $22,700,000 train and station supplies, and all other.

the total for 1932 included approximately $178,000,000 for fuel, $30,800,000 for ties, $15,500,000 for rail and $220,700,000 for other materials. These purchases have been further subdivided on the basis of reports from approximately 35 roads.

The expenditure of approximately $31,000,000 for ties in 1932 compares with approximately $51,000,000 in 1931, $84,000,000 in 1930 and $93,000,000 in 1929. The sum of $15,500,000 spent for rail in 1932 is in contrast with approximately $41,500,000 in 1931, $75,000,000 in 1930, and $94,000,000 in 1929. The expenditure of approximately $100,000,000 for iron and steel products in 1932 compares with approximately $200,000,000 in 1931, $329,000,000 in 1930 and $438,000,000 in 1929. The expenditure for materials and supplies, exclusive of fuel, amounting to approximately $267,500,000 in 1932, is contrasted with approximately $504,400,000 in 1931, $785,648,000 in 1930 and $1,028,657,000 in 1929. Total purchases, including fuel, amounted to approximately 14.1 per cent of operating revenues in 1932, as compared with 16.8 per cent in 1931, 20.2 per cent in 1930 and 21.8 per cent in 1929.

Reductions in traffic have reduced the demand for materials, and declines in prices must also be considered in comparing the present purchases with those of previous years. Except in the case of forest products, however, materials for railway operation and maintenance have been less affected by price changes than has fuel. It is significant, therefore, that expenditures for materials and supplies, exclusive of fuel, have been reduced 79 per cent since 1929, as compared with a reduction of only 47 per cent in fuel. The outlay for miscellaneous materials required for general repairs has declined from a sum more than three times that spent for fuel in 1929 to an amount scarcely more than was spent for fuel in 1932. Special reports received by the *Railway Age* from over 50 roads as to the purchases made each month show that purchases in the aggregate were at the lowest point in July, 1932, and steadily increased through December, but declined again in January and February, 1933.

Compared with expenditures for materials and supplies of approximately $28,400,000 in July, 1932, and approximately $36,900,000 in December, total purchases were about $32,700,000 in January, 1933, and $29,600,000 in February. Disregarding fuel, purchases were $17,650,000 in July, 1932, and $20,310,000 in December, but dropped to $18,100,000 in January and to what at this time appears to be an expenditure of approximately $16,100,000 in February. The upward movement in purchases was not arrested on all the roads, however, and it is possible that complete reports for January and February, 1933, when available, may show a smaller aggregate decline than has been reported. It is also to be observed that, while aggregate purchases last January were appreciably below the purchases in January, 1932, there were, for the first time in three years, a number of roads whose purchases last January were close to or greater than in January, 1932, and, in most cases, the difference in purchases would be less if adjustments were made for price changes.

Why the 131-lb. R. E. Rail Section Was Adopted

An analysis of the new Pennsylvania pattern which has become an A. R. E. A. standard

As reported briefly in the account of the convention of the American Railway Engineering Association, which was published on page 419 of the *Railway Age* of March 18, the association accepted the recommendation of the Committee on Rail to adopt as standard the new 131-lb. P. S. (Pennsylvania) section in place of the 130-lb. R. E. rail which had been an association standard since 1920. In the opinion of the committee, the considerable tonnage of rail rolled to the 110 and 130 lb. R. E. sections has been in use a sufficient length of time to demonstrate that the sections are not altogether satisfactory. A study of the details of the dimensions and proportions of the sections indicate that a more economical distribution of the metal, with resulting increase in strength, may be obtained.

Mr. Faries' Letter

This conclusion gave rise to studies of new sections, leading to the recommendation favoring the Pennsylvania 131-lb. pattern, presenting in support of the conclusion a letter received by the committee from Robert Faries, assistant chief engineer, Pennsylvania, outlining the reasons for the adoption of the section by his railroad. This letter contains such a large fund of information on the

Table of Rail Abrasions

No. 1 Track—Between Spruce Creek and Tyrone

(Tangent and Curved Track)

Wt. Lb. per Yd.	Months of Service	Gross Tons Over Rails (Millions)	Degree of Curve or Tangent	No. Rails Measured	South or Low Rail	Average Sq. In. of Abrasion North No. Rails Measured	North or High Rail	No. Rails Measured	All Rails	Per 10 Million Tons Over Rails	Per cent Wear Based On 100 per cent for 130-lb
130	16	63.5	4 deg. 56 min. 4 " 47 "	20	.446	20	.663	40	.554	.087	100
131	16	63.5	5 " 25 " 5 " 28 "	15	.181	15	.457	30	.319	.050	58
130	16	63.5	Tang.	5	.374	5	.340	10	.357	.056	100
131	16	63.5	Tang.	5	.154	5	.160	10	.157	.025	44

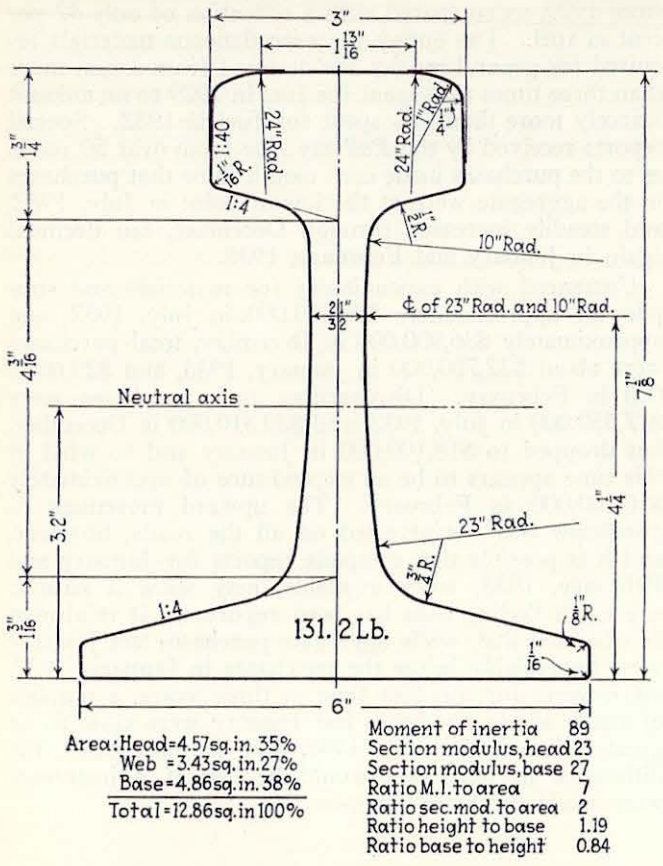


Fig. 1—Dimensions and Properties of the 131-lb. R. E. Rail

subject of rail section design that it is reproduced in full as follows:

Recognition of the fact that the 130-lb. P. S. rail was not entirely satisfactory for present and possible future axle loads, service and speeds, was the primary reason that led to the adoption of the new rail section. It was desired to provide a rail with more vertical stiffness and strength, a head of better wearing shape and a height of fishing space which would allow of the use of better joints. Comparative results obtained from an extensive test of the 127-lb. Dudley section rail in our tracks indicated that a change in our rail section would be advantageous. The design of these new sections was governed by certain general principles and facts developed by research and by experience, which we have set forth in the following:

General Principles

Sections should approach a uniform rate of cooling to avoid setting up strains in the head, web and base. Large masses of metal should be avoided in order to prevent internal strains in any of the parts due to differences of temperature within the mass while cooling. The section should provide maximum stiffness for weight, both vertically and laterally. The proportion of base to height should be sufficient to hold the rail stable under the forces set up by a locomotive starting to overturn.

A summary of investigations relative to the stability against overturning of 130-lb. and 152-lb. P. S. rails, collected from six different sources working independently, is as follows:

1. The relative stability of two rails against overturning about the outside edge of the base is not determined by the ratio of the rail base to the rail height, but rather by the ratio of the moment arm of vertical load to the moment arm of lateral load. A consideration of the above comparison seems to justify the conclusion that the 152-lb. rail should possess practically the same amount of stability against overturning as does the 130-lb. rail, but its influence on locomotive lateral oscillations on tangent is unknown.
2. The 152-lb. rail is not less stable than the 130-lb. rail.
3. The 152-lb. rail on 152-lb. standard inclined tie plates is more stable than 130-lb. rail on standard (not canted) tie plates, under all conditions.
4. There is an ample factor of safety against overturning of the rail, and the stresses in the track fastenings are within safe limits and are no greater than under the heavy steam locomotives moving at present speeds on 130-lb. rail.
5. The 152-lb. rail has ample overturning stability under the P-5 electric locomotive moving at a speed of 100 m.p.h. on 1-deg. 30-min. curves, superelevated 5½ in. or 6 in. and under the K-4-s steam locomotive at a speed of 90 m.p.h.
6. Both rails are less stable for P-5 (electric) than for K-4-s (steam) locomotives and the 152-lb. rail, canted, is more stable than the 130-lb. rail, not canted, for both locomotives, and that the worn rails are less stable than the new rails.

In considering the above conclusions, it should be borne in mind that the dimensional ratios of the 152-lb. and 131-lb. sections are identical.

The depth of the head should be such that after its normal life in important tracks it will have enough metal to insure sufficient strength for a normal life in secondary tracks. The width of the head should be maximum, and yet avoid the guttering of rails by tires on the low side of curves. It is important to provide lateral stiffness in the head, which is obtained by width. Vertical sides instead of sloping sides give extra lateral stiffness, which is very necessary to provide for future loads and speeds. A comparison of the lateral moment of inertia of the tentative 130-lb. R. E. A-2, the 131-lb. P. S. and the 152-lb. P. S. sections with that of the 130-lb. P. S. section is as follows:

Lateral Moment of Inertia

Tentative 130-lb. R.E. Sec. A-2	130-lb. P.S. Section	131-lb. P.S. Section	152-lb. P.S. Section
15.2	13.2	16.1	20.7

In connection with the joint investigation conducted by engineers of the U. S. Steel Corporation and the Pennsylvania leading to the adoption of the 131-lb. and 152-lb. P. S. sections, C. G. E. Larsson, chief consulting engineer, American Bridge Company, calculated the unit pressure on the head in pounds per square inch, with

(*Continued on page 634*)

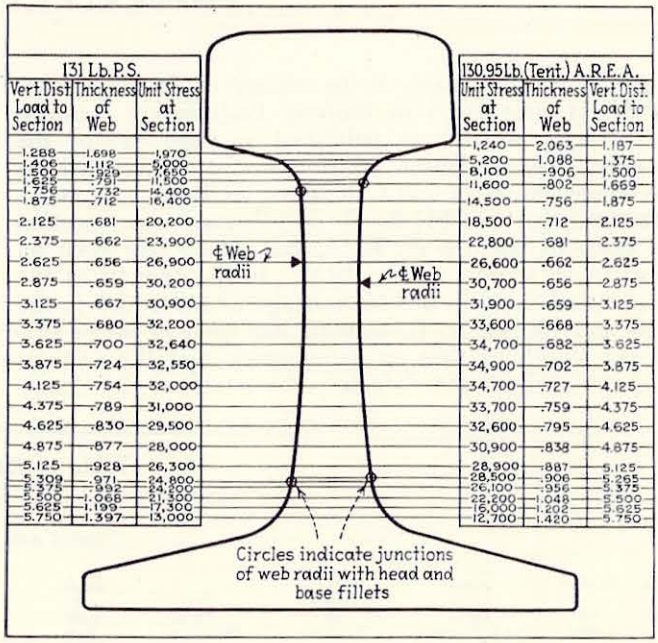


Fig. 2—Vertical Web Stresses in the 131-lb. P. S. (now also R. E.) Section and a Tentative 130.95-lb. Area Section Compared. These are Computed Stresses Resulting from a Single Horizontal Force of 17,000 lb. Acting at a Point ¼ in. Below the Top of the Rail Head

Who Pays Our Highway Bonds?

Answer has become elusive because of curious bookkeeping by the United States Bureau of Public Roads

By Dr. C. S. Duncan
Economist, Association of Railway Executives

THE source of funds for the payment of bonds issued to build highways would seem to be a simple inquiry to be simply answered. The very contrary is true, however, as a result of the curious bookkeeping by the Bureau of Public Roads in the federal Department of Agriculture. To obtain a clear answer requires a real statistical investigation. In some ways it is as elusive as that problem presented by the gentleman of the highway down in El Paso, Texas.

He came into possession one day, by means unknown, of an American silver dollar. At that time the Mexican silver dollar was selling at a discount of ten per cent and, by edict, this discount was reciprocated in Mexico. He stepped into a saloon and purchased a drink of whiskey for ten cents, tendered his silver dollar and got back in change a Mexican dollar. Afterward, he wandered across the bridge into Mexico and purchased there another ten-cent drink. In exchange he got an American silver dollar. Back and forth he went until his thirst was quenched. Whereupon, he sat down in the middle of the bridge, with his silver dollar in his pocket, and propounded to himself this question: "Who the ——, now, has paid for them drinks?"

In a somewhat similar fashion one finds as to highway bonds that claims are made

(a) that the funds derived from bonds are not income;
(b) that such funds are not revenues;
(c) that such funds are not receipts;
(d) that such funds should not appear in the highway account when the proportion of income paid by highway users is being computed;
(e) that state highway bonds are "predicated" upon special motor vehicle fees and taxes; and
(f) that interest and principal on such bonds should not be deducted from special motor vehicle taxes when comparison is made with highway costs.

Hence, a similar inquiry to that raised by the gentleman of the highway in El Paso arises here—Who does pay the highway bonds?

Let us consider briefly, then, what the theory is, who is responsible for it and what validity there is in it.

1. Thomas H. MacDonald, chief of the Bureau of Public Roads, in testifying before the Interstate Commerce Commission in I. C. C. Docket 23400, said:

For 1929 we had motor vehicle fees comprising 31.3 per cent and gasoline taxes 32.4 per cent, or a total of 63.7 per cent of the income for state highway purposes coming from road users alone * * *. We have, further, bond issues of 18.2 per cent, which were almost wholly supported on the income from gas and motor vehicle fees, or a total of approximately 81.9 per cent of the total income for state highways coming from the road user through license fees and the gas taxes. That 81.9 per cent is a trifle high because all bond issues were not supported on this basis, but practically all were.

2. The same witness, in testifying before the Senate Interstate Commerce Committee on the Couzens bill for highway regulation, said with respect to the situation in 1930:

The expenditures for these (state) highways have been largely from the taxes derived from the motor vehicle * * *. The direct income is 61.7 per cent of the total, to which should be added 19.6 per cent from bonds, all issued against the income from the motor vehicle, a total of 81.3 per cent.

3. R. C. Fulbright, in an article entitled "Where the money for Rural Roads Comes From," which appeared in the Engineering News Record of February 25, 1932, writes as follows:

In the case of state highways it will be noted that in 1923 only 7.79 per cent of the income was derived from general taxation and that this had fallen in 1930 to the negligible proportion of 1.31 per cent. Also it will be noted that, even in 1923, 52.13 per cent of the total receipts for state highways were direct from motor-vehicle users, and that in 1930 this percentage had increased to 82.09 per cent.

4. The National Industrial Conference Board, in its study on "Taxation of Motor Vehicle Transportation," page 168, says:

The total state and local rural highway income, which has just been analyzed according to sources, does not afford a satisfactory basis for measuring the share of motor vehicle owners in the cost of highways. The total income includes bond income as well as current revenue from various sources. In considering the tax problems associated with highway financing, bond income may be properly disregarded, for highway bond issues are financed and amortized by means of taxes, very largely out of the proceeds of special motor vehicle license and motor fuel taxes. The income received from the sale of bonds, furthermore, is paid for out of current revenue. For these reasons bond income should not be considered in measuring the contribution made by motor vehicle owners to the cost of highways. The percentage of current rural highway revenue derived from motor vehicle taxes affords a more accurate measure of the share of motor vehicle owners in the cost of highways than does the percentage of total rural highway income so derived. * * * *

The data in this tabulation indicate that, of the current state revenue for rural highway purposes, 682.9 millions, or 81.7 per cent, was accounted for by motor vehicle license and motor fuel taxes.

5. The Brookings Institution, in its recent publication "The American Transportation Problem," pages 544-5, states:

Revenues from user taxes were pledged (1930) to cover interest and amortization on all state borrowings for highway purposes, thereby relieving general property from all obligations on that score. * * * *

As a result of the phenomenal growth of revenue derived from gasoline tax levies (from $3,273,988 in 1921 to $411,109,446 in 1930), user tax revenues accounted directly for 61.7 per cent of all state highway income in 1930 * * *. An additional 19.6 per cent was obtained from borrowings supported wholly by users' taxes. Thus in 1930 motor vehicle users as a special class were responsible, either through direct or through anticipated payment, for 81 per cent of the income made available from all sources for state highway purposes.

We are now able to discern, at least in general outline, what the theory is. As I understand it, the theory says that:

(a) Assuming all money required for payment of principal and interest on bonds issued for improvement of state highways is derived from special motor vehicle taxes, then the sums derived from issue of bonds are not to be considered as highway income. That is the first thing.

(b) The second is that when the sources of income for state highway purposes on an annual basis are being considered and it is desired to determine what proportion of total annual income

or revenue for state highway purposes is represented by special motor vehicle taxes, all sums derived from bonds are not to be considered.

(c) The third point is that, since the funds derived from bonds do not appear in the income or revenue account, then no valid comparison can be made between income or revenues and expenditures in any given year.

(d) The fourth item is that, having eliminated all funds derived from bonds from the income, revenue or receipts account, the special taxes derived from registration fees and gasoline tax receipts may be compared with other funds derived from special taxation or appropriation, or federal aid, or from miscellaneous sources. It is obvious that with the money derived from bonds eliminated, the proportion of the special motor vehicle taxes becomes correspondingly greater.

(e) The fifth point is that, having eliminated bonds from the income or revenue account and having determined the proportion of the remaining funds represented by special motor vehicle taxes, it is then possible to bring in the funds derived from bonds and add them to the proportion derived from special motor vehicle taxes.

This is the curious accounting theory and principle that has been followed by the Bureau of Public Roads,

Table I—Highway Statistics—State Highway System—Years 1927 to 1931, Inclusive

Source: United States Department of Agriculture, Bureau of Public Roads

	Item	1927	1928	1929	1930	1931	Total five years 1927-31
1	HIGHWAY MILEAGE:						
2	Total mileage	293,353	306,442	314,136	324,496	328,942	
3	Non-surfaced mileage	116,787	113,304	105,812	98,275	86,242	
4	Surfaced mileage—Total	175,566	193,138	208,324	226,221	242,700	
5	High type *	60,139	68,373	75,113	84,112	96,341	
6	Low type †	116,427	124,765	133,211	142,109	146,359	
7	SPECIAL TAXES ALLOCATED:						
8	Motor vehicle fees allocated directly to highways for—						
9	Construction and maintenance	$188,839,161	$208,880,272	$223,292,969	$222,146,682	$200,733,786	$1,043,892,870
10	Payment on bonds	30,660,070	29,857,189	31,212,182	30,866,921	33,859,593	156,455,955
11	Total	$219,499,231	$238,737,461	$254,505,151	$253,013,603	$234,593,379	$1,200,348,825
12	Gasoline tax receipts allocated directly to highways for—						
13	Construction and maintenance	$182,095,503	$211,046,591	$297,967,756	$338,927,564	$354,017,281	$1,384,054,695
14	Payment on bonds	6,856,023	14,269,124	19,919,943	20,869,901	27,694,329	89,609,320
15	Total	$188,951,526	$225,315,715	$317,887,699	$359,797,465	$381,711,610	$1,473,664,015
16	Motor vehicle fees and gasoline tax receipts combined allocated directly to highways for—						
17	Construction and maintenance	$370,934,664	$419,926,863	$521,260,725	$561,074,246	$554,751,067	$2,427,947,565
18	Payment on bonds	37,516,093	44,126,313	51,132,125	51,736,822	61,553,922	246,065,275
19	Total	$408,450,757	$464,053,176	$572,392,850	$612,811,068	$616,304,989	$2,674,012,840
20	FUNDS RECEIVED FOR HIGHWAY PURPOSES:						
21	From highway users:						
22	Motor vehicle fees	$239,955,128	$259,134,820	$278,092,734	$289,801,738	$253,402,734	$1,320,387,154
23	Gasoline tax receipts	‡183,080,222	234,163,826	‡298,918,194	‡393,139,103	386,182,600	1,495,483,945
24	Total	423,035,350	493,298,646	577,010,928	682,940,841	639,585,334	2,815,871,099
25	From all other sources:						
26	Taxes and appropriations	49,564,206	54,424,168	71,736,980	43,317,991	35,437,683	254,481,028
27	Miscellaneous receipts	12,521,969	12,611,916	11,726,508	17,083,821	21,143,520	75,087,734
28	Federal aid funds	80,159,671	80,798,365	77,572,691	92,462,836	218,073,818	549,067,381
29	Bond issues and notes	90,979,230	121,483,599	161,229,297	222,288,308	130,613,678	726,594,112
30	Transfers	83,890,890	86,709,904	74,190,412	60,609,297	47,782,602	353,183,105
31	Total	317,115,966	356,027,952	396,455,888	435,762,253	453,051,301	1,958,413,360
32	Total receipts during year	$740,151,316	$849,326,598	$973,466,816	$1,118,703,094	$1,092,636,635	$4,774,284,459
33	*Per cent distribution:*						
34	From highway users:						
35	Motor vehicle fees	32.4	30.5	28.6	25.9	23.2	27.7
36	Gasoline tax receipts	24.8	27.6	30.7	35.1	35.3	31.3
37	Total	57.2	58.1	59.3	61.0	58.5	59.0
38	From all other sources:						
39	Taxes and appropriations	6.7	6.4	7.4	3.9	3.2	5.3
40	Miscellaneous receipts	1.7	1.5	1.2	1.5	1.9	1.6
41	Federal aid funds	10.8	9.5	8.0	8.3	20.0	11.5
42	Bond issues and notes	12.3	14.3	16.5	19.9	12.0	15.2
43	Transfers	11.3	10.2	7.6	5.4	4.4	7.4
44	Total	42.8	41.9	40.7	39.0	41.5	41.0
45	Total receipts during year	100.0	100.0	100.0	100.0	100.0	100.0
46	DISBURSEMENTS OF FUNDS BY STATE HIGHWAY AUTHORITIES:						
47	Expenditures on highways:						
48	Construction and right-of-way	$404,217,317	$538,043,138	$557,400,625	$713,117,045	$730,954,832	$2,943,732,957
49	Maintenance	138,783,358	159,807,793	173,060,321	191,683,477	160,980,079	824,315,028
50	Miscellaneous and overhead	48,823,297	20,505,483	5,524,358	2,227,459	4,312,553	81,393,150
51	Equipment, materials, etc.	13,390,076	4,011,620	18,056,509	22,301,725	21,482,550	79,242,480
52	Interest on bonds and notes	35,280,821	36,950,034	45,834,531	50,668,141	61,862,079	230,595,606
53	Total	640,494,869	759,318,068	799,876,344	979,997,847	979,592,093	4,159,279,221
54	Expenditures for other purposes:						
55	Principal payments on bonds	30,694,719	27,703,499	42,384,378	69,504,631	57,278,207	227,565,434
56	Other obligations assumed	.....	7,357,992	22,433,195	23,276,341	21,169,768	74,237,296
57	Transfers	35,989,560	35,885,350	45,791,374	66,897,782	32,969,431	217,533,497
58	Total disbursements during year	$707,179,148	$830,264,909	$910,485,291	$1,139,676,601	$1,091,009,499	$4,678,615,448
59	Proportion by which special tax receipts (motor vehicle fees and gasoline taxes combined) failed to meet total highway expenditures and payments on bonds (principal and interest):						
60	Amount (excess items 53 + 55 over item 24)	$248,154,238	$293,722,921	$265,249,794	$366,561,637	$397,284,966	$1,570,973,556
61	Per cent	37.0	37.3	31.5	34.9	38.3	35.8
62	Proportion by which special tax receipts (motor vehicle fees and gasoline tax combined) failed to meet total highway disbursements:						
63	Amount (excess item 58 over item 24)	$284,143,798	$336,966,263	$333,474,363	$456,735,760	$451,424,165	$1,862,744,349
64	Per cent	40.2	40.6	36.6	40.1	41.4	39.8
65	Amount by which actual payments on bonds (items 52 + 55) were greater than total special taxes allocated for payment on bonds (item 18)	$28,459,447	$20,527,220	$37,086,784	$68,435,950	$57,586,364	$212,095,765
66	Ratio per cent of special taxes allocated for payment on bonds (item 18) to actual payments on bonds (items 52 + 55)	56.9	68.3	58.0	43.1	51.7	53.7

* High type surfaced mileage consists of bituminous macadam by penetration, sheet asphalt, concrete, brick, and block.
† Low type surfaced mileage consists of sand-clay topsoil, gravel, chert, and waterbound macadam.
‡ Figures adjusted to properly allocate the $17,970,343 of gasoline taxes of former years held by courts (Illinois) which were included in 1930 receipts by the Bureau of Public Roads. Of the total of $17,970,843—$6,310,565, was applicable to 1927, and $11,659,778 to 1929.

Table II—Actual Payments on Highway Bonds Related to Special Taxes Allocated for Payments on Bonds

(Special Taxes include Motor Vehicle Fees and Gasoline Tax Receipts)

Source: United States Department of Agriculture, Bureau of Public Roads

Item	1925	1926	1927	1928	1929	1930	Total six years 1925-30	1931
STATE HIGHWAYS:								
1 Special taxes allocated for payments on bonds: *a*								
2 From motor vehicle fees	$19,124,014	$19,861,995	$30,660,070	$29,857,189	$31,212,182	$30,866,921	$161,582,371	$33,859,593
3 From gasoline tax.....	4,980,463	5,238,869	6,856,023	14,269,124	19,919,943	20,869,901	72,134,323	27,694,329
4 Total—special taxes	24,104,477	25,100,864	37,516,093	44,126,313	51,132,125	51,736,822	233,716,694	61,553,922
5 Principal payments on bonds	25,647,232	21,879,325	30,694,719	27,703,499	42,384,378	69,504,631	217,813,784	57,278,207
6 Interest payments on bonds	28,161,065	33,690,051	35,280,821	36,950,034	45,834,531	50,668,141	230,584,643	61,862,079
7 Actual payments on bonds	53,808,297	55,569,376	65,975,540	64,653,533	88,218,909	120,172,772	448,398,427	119,140,286
8 Amount by which actual payments on bonds (Item 7) was greater than total special taxes allocated for payments on bonds (Item 4).....	29,703,820	30,468,512	28,459,447	20,527,220	37,086,784	68,435,950	214,681,733	57,586,364
9 Ratio per cent of special taxes allocated for payments on bonds (Item 4) to actual payments on bonds (Item 7)....	44.8	45.2	56.9	68.3	58.0	43.1	52.1	51.7
OTHER HIGHWAYS:								
1 Special taxes allocated for payments on bonds: *a*								
2 From motor vehicle fees	.....	$5,412,163	$7,427,528	$1,968,722	$1,971,291	$5,442,761	$22,222,465	
3 From gasoline tax.....	$873,240	.....	3,230,433	3,350,871	3,451,842	10,179,135	21,085,521	
4 Total—special taxes	873,240	5,412,163	10,657,961	5,319,593	5,423,133	15,621,896	43,307,986	
5 Principal payments on bonds	74,032,348	91,070,298	104,796,268	103,281,707	106,032,780	112,576,447	591,789,848	
6 Interest payments on bonds	51,844,737	66,685,149	75,015,780	79,806,915	78,277,070	82,604,925	434,234,576	
7 Actual payments on bonds	125,877,085	157,755,447	179,812,048	183,088,622	184,309,850	195,181,372	1,026,024,424	Complete data not available
8 Amount by which actual payments on bonds (Item 7) was greater than total special taxes allocated for payments on bonds (Item 4)	125,003,845	152,343,284	169,154,087	177,769,029	178,886,717	179,559,476	982,716,438	
9 Ratio per cent of special taxes allocated for payments on bonds (Item 4) to actual payments on bonds (Item 7)....	0.7	3.4	5.9	2.9	2.9	8.0	4.2	
ALL RURAL HIGHWAYS:								
1 Special taxes allocated for payments on bonds: *a*								
2 From motor vehicle fees	$19,124,014	$25,274,158	$38,087,598	$31,825,911	$33,183,473	$36,309,682	$183,804,836	
3 From gasoline tax....	5,853,703	5,238,869	10,086,456	17,619,995	23,371,785	31,049,036	93,219,844	
4 Total—special taxes	24,977,717	30,513,027	48,174,054	49,445,906	56,555,258	67,358,718	277,024,680	
5 Principal payments on bonds	99,679,580	112,949,623	135,490,987	130,985,206	148,417,158	182,081,078	809,603,632	
6 Interest payments on bonds	80,005,802	100,375,200	110,296,601	116,756,949	124,111,601	133,273,066	664,819,219	
7 Actual payments on bonds	179,685,382	213,324,823	245,787,588	247,742,155	272,528,759	315,354,144	1,474,422,851	Complete data not available
8 Amount by which actual payments on bonds (Item 7) was greater than total special taxes allocated for payments on bonds (Item 4).....	154,707,665	182,811,796	197,613,534	198,296,249	215,973,501	247,995,426	1,197,398,171	
9 Ratio per cent of special taxes allocated for payments on bonds (Item 4) to actual payments on bonds (Item 7)....	13.9	14.3	19.6	20.0	20.8	21.4	18.8	

a According to a statement made by a representative of the Bureau of Public Roads, special taxes allocated for "payment of bonds" are for principal and interest.

announced by the chief of that Bureau and copied by all succeeding students of the subject. The source, therefore, is the Bureau of Public Roads and its chief bears the responsibility. That is clear.

It now becomes apparent as to why a statistical difficulty arises here which is analogous to that raised by the gentleman of the highway in El Paso, Texas. Who does actually pay the principal and interest on highway bonds? How is it possible to exclude funds derived from bonds from the income, revenue or receipts account, on an assumption that they are paid out of one source of income already included, and yet never deduct the principal and interest from the funds derived from that source? This is indeed curious accounting. What validity is there in it?

While one reference is made in the above citations to the year 1929, it will be noted that attention has been centered upon the year 1930. Let us, therefore, consider this year 1930 with respect to the amount of bonds, principal and interest, paid in that year and the amount of special motor vehicle taxes, that is, registration fees and gasoline tax receipts, allocated in that year to the payment of principal and interest on these bonds. (Refer to data in Table I.)

The Bureau of Public Roads has published the figures for special motor vehicle taxes for 1930 as amounting to $700,911,184. As a matter of fact, this figure contains $17,970,343 of gasoline taxes held by the courts in the state of Illinois, which were collected in the years 1927 and 1929. As a matter of another fact, the Bureau of Public Roads had already accredited the proper amounts to 1927 and 1929 and, hence, this sum has been duplicated in the reports. The true figure, therefore, should be $682,940,841.

In 1930 from special motor taxes there were allocated:

Payment on bonds from motor vehicle fees	$30,866,921
Payment on bonds from gasoline tax receipts	20,869,901
Total payment on bonds, principal and interest	$51,736,822

The disbursements of funds by state highway authorities in the year 1930 were as follows:

Interest on bonds and notes	$50,668,141
Principal payments on bonds	69,504,631
Total	$120,172,772

(Data from Table; for other highways refer to Table II)

It becomes apparent, therefore, that in 1930 special motor vehicle taxes failed to meet bond principal and interest payments by $68,435,950. In other words, special motor vehicle taxes actually paid only 43.1 per cent of the principal and interest of bonds falling due in 1930. From other sources, leading back finally to the general taxpayer, came the balance of the amount, $68,435,950, or 56.9 per cent.

Compare these percentages of 43.1 per cent from special motor vehicle taxes and 56.9 per cent from other taxes with the testimony of the chief, Bureau of Public Roads before the Senate Interstate Commerce Committee, in which he said:

> The direct income (from motor vehicles) is 61.7 per cent of the total, to which should be added 19.6 per cent from bonds, all issued against the income from the motor vehicle.

His error is obviously the difference between 43.1 per cent and 100 per cent, or 56.9 per cent. This difference is rather more than a "trifle".

The accounting principle which should be applied here is that—

(a) If funds received from bonds and notes are not to be considered income because "issued against" or "predicated upon" special motor vehicle taxes, then the amount of principal and interest actually paid in any given year should be subtracted from the motor vehicle license fees and gasoline tax receipts;

(b) On the other hand, the funds received from bond and note issues should not appear either in the income account or in the annual expenditures account.

The first error which the chief, Bureau of Public Roads, has made, and in which he has been followed by many others, is that he has failed to deduct the amount allocated for payment of principal and interest of bonds and notes from the motor vehicles' contribution. The second error is that principal and interest payments on bonds and notes did not come out of special motor vehicle fees except as to 43.1 per cent of the total.

There is another element which should receive consideration. In the highway account is an item "other obligations assumed". To this item there is a footnote in the Bureau of Public Roads' report to the effect that it "represents disbursement obligations by law not directly related to state highway expenditures". Among the items cited are interest payments on county road bonds issued for state highway account, traffic police, primary road connections in densely populated areas and district commission expenses. This item also should be deducted from the special motor vehicle taxes in the same manner as funds for the payment of principal and interest on bonds falling due. It represents a current expense and is a legal obligation. For 1930 this item was $23,276,341.

If, then, the state highway account with reference to principal and interest of bonds and other legal obligations be set up correctly for 1930, it would show as follows:*

Funds received for State Highway purposes from Highway Users		
Motor vehicle Fees	$289,801,738	
Gasoline Tax receipts	393,139,103	
		$682,940,841
Deduct bond payment, interest and principal		51,736,822
Leaving		$612,811,068
Deduct obligations assumed		23,276,341
Leaving		$589,534,727
Total receipts for State Highways, 1930		$1,118,703,094
Deduct bond issues and notes		222,288,308
Leaving		$896,414,786

* Refer for data to Table I.

This set-up, therefore, shows special motor vehicle taxes represented about 63.5 per cent of income, instead of the 81 or 82 per cent cited in the various quotations above and emanating originally from the chief, Bureau of Public Roads.

If the total current obligations, including principal and interest on bonds falling due and other obligations assumed, had actually been paid out of special motor vehicle taxes in 1930, then, $50,668,141 for interest on bonds and notes, $69,504,631 for principal payments on bonds and $23,276,341 for other obligations assumed, or a total of $143,449,113 should be deducted from funds received from highway users amounting to $682,940,841. This leaves a balance of $539,491,728 to be matched against total receipts, less bond issues and notes, of $896,414,786. The proportion of income or revenue for state highways paid by highway users in 1930 on the basis assumed by the Bureau of Public Roads, therefore, becomes 60.2 per cent, instead of the 81 or 82 per cent. This difference, also, is something more than a "trifle".

The point may be raised that the year 1930 is not a typical year with respect to the payment of bonds and other obligations out of special motor vehicle taxes. An examination of the year 1929 shows that out of a total payment of principal and interest of such bonds and other current legal obligations of $110,652,104, special motor vehicle taxes represented $51,132,125, or 46.2 per cent. In 1931, out of a total payment of bond principal and interest, and other obligations of $140,310,054, special motor vehicle taxes paid $61,553,922, or about 43.7 per cent. (Refer for data to Table I.)

A "Trifling" Error of 53.6 Per Cent

An examination of a longer period shows similar results. For the five years 1927-1931, inclusive, bond payments, interest and principal, and other obligations amounted to $532,398,336. There has been allocated out of special motor vehicle taxes during this same period for payment of bonds a total of $246,065,275. These special motor vehicle taxes during the five-year period have failed to pay the principal and interest on bonds and current legal obligations by $286,333,061, or 53.6 per cent. For this period, therefore, the assumption that all state highway bonds, principal and interest, and other current obligations had been paid out of, or had been "predicated upon," special motor vehicle taxes, is in error by the so-called "trifle" of 53.6 per cent.

While dealing with the subject of highway bonds it will be interesting to note other figures in the state highway account. The following table* sets up the amount of highway and bridge bonds outstanding at the end of each year 1926-1930, inclusive:

Year	Amount Highway and Bridge Bonds Outstanding
1926	$765,677,950
1927	857,314,950
1928	892,539,150
1929	1,008,856,150
1930	1,151,571,820

* Data from Bureau of Public Roads.

The substantial and steady increase in the state highway debt is apparent from the above table. It may be assumed that these bonds were issued in order to secure funds for improving the highways with some kind of surface. Therefore, the bonded indebtedness, calculated on the basis of miles of surfaced highway in the state system, shows the following results:

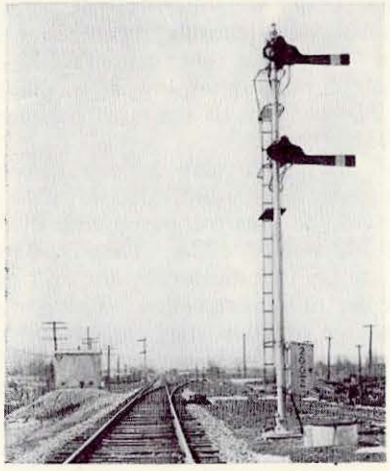
Year	Per Mile of Surfaced Highway
1927	$4,883
1928	4,621
1929	4,843
1930	5,090

A single further item in the state highway account

(Continued on page 635)

Remote Control Replaces Interlocking on the Wabash

End of double-track switch and signals controlled by C. T. C.—Saves 62 per cent annually



The Old Mechanical Plant is Gone

A MECHANICAL interlocking plant at the end of double track 2.3 miles east of Peru, Ind., on the Wabash, has been replaced by a power-operated switch and signals, which are controlled remotely by a C. T. C. system from the station at Peru, thereby effecting a saving in operating expenses of $5,700 annually, which represents a return of 62.1 per cent on $8,296, the cost of the changes.

Peru is a subdivision point with a yard and engine terminal. As a means of reducing delays, a second track was provided several years ago from the Chesapeake & Ohio crossing, 1.9 miles west of Peru, through the yard to East Peru Junction, 2.3 miles east of the station. The switch at the west end of the double track is operated by a mechanical interlocking, which also protects the C. & O. crossing. Likewise, at the east end of the double track an eight-lever mechanical interlocking, known as East Peru Junction, had been in service, with one operator on duty each trick. The wages of these men, based on the present rates of pay, and the maintenance of the building, including heat, light and supplies, totaled about $5,700 annually.

As a means of reducing operating expenses, it was decided to eliminate the mechanical interlocking at East Peru Junction, to install a power machine to operate the switch at the end of double track, and to control this switch and the signals for directing train movements at this point by C. T. C. coded control, with the control machine in the office of the operator at Peru. A spring switch was not adapted to this location because westbound passenger trains are frequently run over the eastward main.

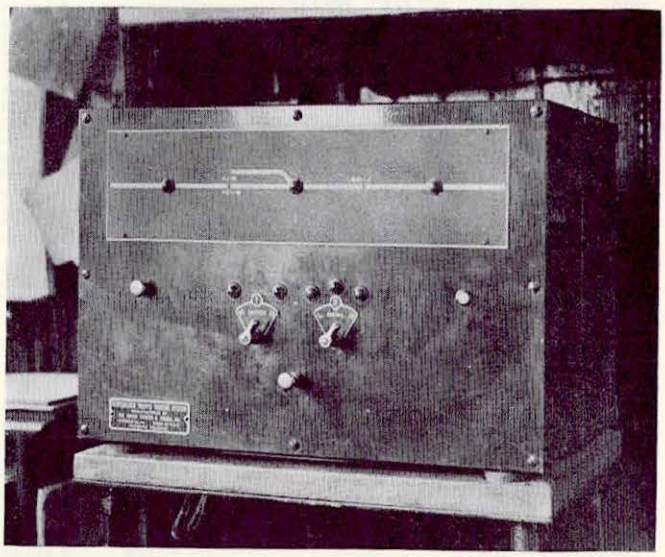
The New Layout

The two electric semaphore high signals that were formerly used as home signals for the interlocking, were included in the new layout, and a new searchlight-type dwarf signal was installed for eastward movements on the westward main. Three-indication color-light distant signals were in place as part of the automatic block system.

The control machine in the office at Peru is about 12 in. high and 18 in. long, and is located on a typewriter stand with casters so that it can be moved to a position convenient to the operator's chair, if desired. Only two levers are required, one for the switch and the other for the signals. The signal lever is thrown to the left to clear the westward signal and to the right to clear the eastward signal. The eastward high signal or the dwarf clears, depending on the position of the switch. The switch lever has two lights which repeat the position of the switch. The signal lever has three lights; the one in the center is lighted to show red when all signals are at stop, while the one on the left is lighted when the westward signal is clear, and the one on the right is lighted to show when the eastward signal is clear. Small lights, mounted in the track diagram above the levers, indicate when a train is approaching or when passing over the switch.

Code Control Used

The control used on this installation is the Union Switch & Signal Company's two-wire time code system, operating on the single-station basis. All of the control



A Small Control Machine is Now Located in the Peru Office

equipment is housed in the cabinet on which the levers are mounted, as shown in the photograph. A battery of eight cells of Exide EMGO-7 storage cells is used for the line and coding circuits. The control system requires only two line wires between the Peru office and the power switch layout.

The new switch machine is the Union Type M-22, with dual control, operating on 26 volts d-c. A battery of 13 cells of Exide EMGO-7 storage cells supplies power for the operation of the switch, five of these cells being used also for the operation of the relays and signals nearby, while eight of these cells are for the operation of the signals located more remotely, as well as for the coding equipment.

The relays, battery, rectifier, etc., at the switch layout are located in a Massey concrete house 9 ft. long and 6

ft. wide. A partition made of heavy locomotive front-end screen cuts off three feet of space just inside the door of the house, this space being used as a telephone booth and as a shelter for a track man during severe storms. An ordinary switch lock is used on the main door of the house, but a signal department lock is used on the door in the partition.

The signal materials on this installation were furnished by the Union Switch & Signal Company, the engineering and construction being handled by the signal department forces on the Wabash.

Rail Production Lowest Since 1866

THE production of rails in the United States during 1932 was 402,566 gross tons, which is the smallest production in any year since 1866, when the total was 384,623 tons. Another comparison is afforded by the fact that the output in 1932 was only 10.1 per cent of the production in the record year of 1906, and 34.8 per cent of the production in 1931. These figures are taken from statistics prepared by the American Iron & Steel Institute, which show, also, that the production of rails weighing 100 lb. or more per yard—namely, 343,613 tons—represented 85.3 per cent of the total, which is to be compared with 76 per cent in 1929. However, for the first time since rails weighing 120 lb. per yard or over have been tabulated separately, there was a decrease in the proportion of the total represented by these larger rails. Thus, in 1932, rails of these weights amounted to 128,523 tons or 29.4 per cent of the total, compared with 40 per cent in 1931.

The tables of production also include rails rerolled from defective rails and from old rails, this classification amounting to only 9,488 tons compared with 21,372 tons in 1931 and 139,742 tons in 1923. That Bessemer rails are no longer a factor, is indicated by the fact that only 64 tons of Bessemer rails were rolled. There was an increase in the tonnage of alloy steel rails from 533 tons in 1931 to 565 tons in 1932. However, the total is small compared with that of 1930, when 4,687 tons of alloy steel rails were rolled.

Production of Rails by Weight per Yard, 1917-1932, Gross Tons

Years	Under 50 pounds	50 and less than 85	85 and less than 100	100 and less than 120	120 pounds and over	Total
1917	308,258	882,673	989,704	763,526		2,944,161
1918	395,124	665,165	888,141	592,462		2,540,892
1919	263,803	495,577	965,571	478,892		2,203,843
1920	489,043	433,333	952,622	729,118		2,604,116
1921	211,568	214,936	902,748	849,566		2,178,818
1922	265,541	274,731	728,604	902,900		2,171,776
1923	272,794	300,907	864,965	1,465,850		2,904,516
1924	191,046	213,274	853,431	1,175,581		2,433,332
1925	163,607	219,648	765,371	1,636,631		2,785,257
1926	197,260	256,287	797,662	1,966,440		3,217,649
1927	161,836	173,257	539,445	1,314,424	617,524	2,806,486
1928	134,197	125,726	465,393	1,203,749	718,428	2,647,493
1929	141,362	102,944	409,628	1,233,599	834,605	2,722,138
1930	95,626	81,299	267,879	835,496	592,933	1,873,233
1931	50,089	25,524	123,398	495,752	462,988	1,157,751
1932	16,655	13,705	28,593	215,091	128,522	402,566

Girder and high T rails for electric and street railways are included in the figures given above. For recent years the tonnage was as follows: 1924, 85,533; 1925, 98,620; 1926, 116,374; 1927, 99,621; 1928, 113,150; 1929, 109,678; 1930, 69,814; 1931, 44,652; and 1932, 29,003 gross tons.

Production of Rails by Processes, 1917-1932, Gross Tons

Years	Open-hearth	Bessemer	Electric	Rerolled*	Total
1917	2,292,197	533,325	...	118,639	2,944,161
1918	1,945,443	494,193	...	101,256	2,540,892
1919	1,893,250	214,121	50	96,422	2,203,843
1920	2,334,222	142,899	297	126,698	2,604,116
1921	2,027,215	55,559	5	96,039	2,178,818
1922	2,033,000	22,317	...	116,459	2,171,776
1923	2,738,779	25,877	118	139,742	2,904,516
1924	2,307,533	16,069	...	109,730	2,433,332
1925	2,691,823	9,687	...	83,747	2,785,257
1926	3,107,992	12,533	...	97,124	3,217,649
1927	2,717,865	1,566	...	87,055	2,806,486
1928	2,580,141	2,718	438	64,196	2,647,493
1929	2,662,163	3,486	723	55,766	2,722,138
1930	1,834,933	2,137	45	36,118	1,873,233
1931	1,135,551	813	15	21,372	1,157,751
1932	393,014	64	...	9,488	402,566

* Rerolled from old steel rails.

Production of Alloy-Treated Steel Rails, 1922-1932, Gross Tons

Years	Total production	Production by alloys: Titanium	Production by alloys: Other alloys	Production by processes: Open-hearth	Production by processes: Electric	Production by Weight per yard: Under 50 lbs.	50 and under 85 lbs.	85 and under 100 lbs.	100 and under 120 lbs.	120 lbs. and over
1922 ..	3,163	2,493	670	3,163	...	...	321	835	2,007	
1923 ..	2,142	346	1,796	2,024	118	...	56	317	1,769	
1924 ..	5,167	1,696	3,471	5,167	...	...	...	847	4,320	
1925 ..	4,009	1,616	2,393	4,009	...	70	47	...	3,892	
1926 ..	4,216	1,099	3,117	4,216	...	...	42	1,027	3,147	
1927 ..	1,265	....	1,265	1,265	...	...	...	374	391	500
1928 ..	6,453	3,711	2,742	6,015	438	29	...	879	1,652	3,893
1929 ..	1,965	486	1,479	1,242	723	100	...	748	967	150
1930 ..	4,687	517	4,170	4,642	45	146	...	885	1,137	2,519
1931 ..	533	.....	533	518	15	...	...	282	232	19
1932 ..	565	.....	565	565	...	...	...	75	490	.....

Why the 131-lb. R. E. Rail Section Was Adopted

(*Continued from page 628*)

new tires on new rail, and the vertical shear in the head for the above mentioned P. S. sections and a 170-lb. section suggested by him for a hypothetical L-6 electric locomotive with 100,000-lb. axle loads at a speed of 100 miles per hour. These calculations were checked independently by F. M. Graham, assistant engineer of standards. The results are shown in the following table:

Unit Pressure and Vertical Shear

(Assumed 1-deg. Curve with 6-in. Superelevation)

	130-lb P.S.	131-lb. and 152-lb. P.S.			17-lb. Suggested by Mr. Larsson
Radius of Head	12 in.	24 in.	36 in.	40 in.	Flat
Unit Pressure on Head.	205,000	158,000	141,000	134,000	81,500
Vertical Shear in Head..	39,500	31,100	27,800	26,400	16,500
Dist. of Ctr. of Bearing to Ctr. of Head...	0.6 in.	0.6 in.	0.6 in.	0.67 in.	0
Cant of Rail.....	None	1 in 40	1 in 30	1 in 30	1 in 20

It is apparent that the metal in the head is badly overstressed, which results in immediate side and end overflow, particularly at the end where symmetrical resistance of the surrounding metal is lost on one side of the area of pressure. This pressure should be distributed over the rail head as much as possible. It becomes so distributed when the rail is worn and the contour of the worn rail is the contour of the average wheel. Over-run of metal in the center of the rail head results in the breaking out of large chips due to slight movements vertically between rail ends. Over-run on the fillets at the edge of the rail is not so serious, and while some chipping may develop, it is small and not of much consequence. While heat treatment and grinding of rail ends, and cutting off the overflow, minimizes these difficulties, it is better to have a properly shaped wearing surface to start with.

On curves the wearing surface of the head has a decided effect upon abrasion from wheel flanges. This is shown in the table for both tangent and curved track after 1 year 4 months' service (gross tonnage 63,500,000) of 130-lb. P. S. and 131-lb. P. S. rails.

The Web and the Base

Maximum fishing section should be provided to give strength to the joint. Short radius fillets, which concentrate stresses, should be avoided. The web should be so designed that uniform fibre stresses well within the

elastic limit of the material will result from application of maximum vertical and lateral loads. These stresses for the tentative 130-lb. R. E. A-2 and 131-lb. P. S. sections are shown on Fig. 2. The horizontal force of 17,000 lb. was the maximum measured lateral force developed in the Claymont tests with an electric locomotive at high speeds.

Certain theoretical calculations of web and fillet stresses show quite high stresses under the head, but such calculations are based on conditions away from the rail end and where web failures seldom or never occur. At the rail end conditions are entirely different and a number of web failures occur at this point, but it is our experience that 73 per cent of them are above the base of rail and below the neutral axis. The facts outlined above led us to provide a web of conventional design, but somewhat thicker and stronger in the area between the neutral axis and the bottom.

The width of the base is fixed by the accepted H/B ratio, which is the result of conclusions drawn from calculations involving many variables, of which speed, axle load, loading arrangement, position of the center of gravity and character of fastenings are representative. The thickness of the base should be such that the maximum fibre stress is well within the elastic limit. The experience of the Pennsylvania has been that numerous base failures occurred in rails with lighter base sections than the 130-lb. P. S., 131-lb. P. S. and 152-lb. P. S. rails.

Comparative Strength

From Professor Talbot's formula, given in the first progress report of the Committee on Stresses in Railroad Track, comparative data for different sections of rail can be calculated for simple and supported spans. Using the calculated data for the rail sections referred to in this report, their comparative strength on the basis of $\frac{1\frac{3}{4}}{C}$ is as follows:

130 lb. P.S.	100.00
Tentative 130 lb. R.E.Sec. A-2	103.13
131 lb. P.S.	105.38
152 lb. P.S.	121.39

Who Pays Our Highway Bonds?

(*Continued from page 632*)

needs some explanation. Reference is made to "transfers." This item appears both in the state highway account and in the account for other highways. Funds evidently pass back and forth. This ought to mean duplication and the Bureau of Public Roads has indicated that, since money moves from state to local highway jurisdictions and from these local jurisdictions to the state, the thing to do is to wipe the slate clean. In this connection, however, it is well to note that the sums moving each year in each direction are not the same. In fact, for the five-year period 1927-1931, inclusive, the funds transferred from state authorities to local jurisdictions aggregated $217,533,497. The aggregate funds for this same period moving from local jurisdictions into the coffers of the state highway departments amounted to $353,193,105. It appears from these figures, therefore, that for this five-year period the state highway departments received through net transfers $135,649,608. This amount to the advantage of the state highway departments is certainly too large a sum to be nonchalantly wiped off the slate.

Conclusions

This examination into the accounting methods of the Bureau of Public Roads as to the limited state highway system, representing only 10 to 11 per cent of the total rural highway mileage but upon which have been concentrated expenditures out of motor vehicle license fees and gasoline tax receipts, leads to the following conclusions:

1. The chief, Bureau of Public Roads, has made a gross error in his public and official pronouncements that all bonds for state highway purposes have been "issued against the income from the motor vehicle"—
—by $68,435,950, or 56.9 per cent in 1930.
—by $57,586,364, or 48.3 per cent in 1931.
—by $212,095,765, or 46.3 per cent in five year period 1927-31.

2. His highway accounting method in disregarding income from bonds and notes, without first deducting the amount required for annual payment of principal and interest from income, is wholly indefensible and duplicates by that amount the alleged income.

3. If, as alleged by him but demonstrated from his own records to be untrue, all highway bonds, principal and interest, had been "issued against" or "predicated upon" motor vehicle license fees and gasoline tax receipts and had been actually paid therefrom, the proportion of total income available from that source for state highway improvement in 1930 would have been about 63 per cent, instead of 81.3 per cent as he has stated. Again, if from motor vehicle license fees and gasoline tax receipts for 1930, bond payments, interest and principal, due in that year, and other legal obligations assumed which are in the same category, were taken, the proportion of income remaining for highway improvement from this source becomes 60.2 per cent, instead of the 81.3 per cent as stated by him.

4. All those who have dealt with this subject and have followed blindly and uncritically the methods employed by the chief, Bureau of Public Roads, have likewise, fallen into similar egregious error.

5. Bonded indebtedness for improvement of the state highway system has been steadily increasing and in 1930 the bonded indebtedness per mile of surfaced highway in the state system for the country as a whole was $5,090.

6. In the item of transfers between the state system and local jurisdictions, the net advantage has been to the state highway system in the five-year period 1927-1931, inclusive, to the amount of $135,649,608.

7. There is immediate need for the records of the Bureau of Public Roads to be corrected and the public pronouncements modified so that the actual situation may be publicly known.

8. The public is entitled to know who the ——, well, who actually does pay the state highway bonds.

THE NETHERLANDS RAILWAYS have placed orders for 40 Diesel-electric trains, consisting of three coaches each according to a report received by the U. S. Commerce Department's Transportation division. The orders were placed with builders in that country. Mayback Diesel motors were chosen for these trains and it is believed in railway circles in the Netherlands that the Netherlands Railways are not likely to undertake any further electrification development in the near future; the new type of Diesel-electric will be used instead.

Communications . . .

Good Merchandising

HOUSTON, TEXAS.

TO THE EDITOR:

Referring to the article in the *Railway Age* of January 7, headed, "Would This Happen in a Bus Office?"

The South can equal the experience related by H. C. Rosacker, purchasing agent of the Union Stock Yards Company of Omaha, Nebr., headed, "This Happened on a Railroad," published in the *Railway Age* of March 4.

Just yesterday I purchased for two friends through the Missouri Pacific ticket agent at Houston, two tickets good on the New York Central Lines from St. Louis, Mo., to New York City, and also arranged reservations and obtained at Houston Pullman Company tickets for the same trip. The tickets were delivered without charge, notwithstanding they were for passage on another line in which, so far as I know, the Houston line had no interest other than the exchange of business with each other.

In fairness to the railroads, should this not also be given as much publicity as the first named article?

F. E. TURNER,
Secretary to General Manager
Missouri Pacific Lines.

What Services Should Taxpayers Be Expected to Provide?

NEW YORK.

TO THE EDITOR:

The advertisement which appeared in your issue of April 1, pretending to show that taxes for highways are a "dole" to special interests and taxes for schools are not, might have been supposed to have been an April fool joke if it were not in line with similar information previously issued from the same source. It is so prejudicial to any sane consideration of the railway-highway problem that I believe the railways should vigorously protest against its use.

One wonders what would happen to the railways if there were no highways at all. To say that taxes devoted to street and highway construction are a "dole" to special interests is to say that they are a "dole" to the railways.

I am aware that the railways pay part of the highway taxes but, so do millions of other citizens, property owners, and vehicle owners.

I have no children of school age but I pay a fairly heavy school tax. I suppose the railways pay part of the school tax. Why isn't this a "dole" to the schools?

I realize that the railway taxation problem is serious. The whole problem of the maintenance of our main transportation system is a serious one but it will never be solved by such patently unfair inferences as those which this advertisement tends to convey.

F. LAVIS.

[We are surprised that so eminent an engineer as Mr. Lavis should fail to distinguish between the propriety of providing schools at the expense of the taxpayers and that of providing transportation at their expense. Public education, national defense, the maintenance of police and courts of justice—all these are broad public functions in which government must engage and the cost of which it is plainly fair to spread over the whole people. The provision of transportation, however, is a specific economic service and there is no more reason in sound public policy for supplying it at the expense of the taxpayers, rather than at that of those who use it, than there is for so supplying food, clothing or housing. If a large part of the expense of providing highway transportation is to be paid by the taxpayers, then why not have them, rather than the users, also pay a large share of the cost of railway transportation; or the grocers' and landlords' bills of solvent citizens?

Mr. Lavis wonders what would become of the railways if there were no highways. Admittedly they would be in a bad way. But they would be in a bad way also if there were no factories or stores, and yet the taxpayers are not called upon to pay the capital charges and operating expenses of factories simply because they confer a benefit. The utility of an industry or service is no reason for assuming that it should be provided at public expense.

It may be argued, since automobile ownership is so widespread, that it can make little practical difference whether the people pay for highway use through motor vehicle fees or tolls or by general taxation. This argument might have considerable force if, in point of fact, the highways were built only to provide for the normal transport needs of private citizens, and were used exclusively by them. The fact is, however, that they are built much wider and stronger, and at tremendously greater expense, to accommodate heavy commercial users, than would be necessary for the normal traffic of the general public.

It appears quite likely that present motor vehicle and gasoline fees would be ample to cover the annual highway bill and hence cause the "dole" to disappear if the small proportion of very heavy vehicles were banned from the roads and construction and maintenance reduced to the requirements of light vehicles. Until that is done, however, or until commercial users of the roads are required to pay all the costs ascribable to them plus the equivalent of taxation on the investment in highways necessary for their use, we shall believe that the advertisement to which Mr. Lavis objects is based upon sounder logic and economics than is his complaint.—EDITOR].

Public Spending or Public Lending?

BOSTON, MASS.

TO THE EDITOR:

A while back the President released to the press some five or six points for self-liquidating unemployment relief. As the spirit of the suggestions was most heartening and in line with the vigorous attack the Chief Executive is making all along the front, no serious criticism is intended. Still a comparative observation may be pardonable to gage the merits of a suggestion of the writer for an aid to unemployment.

Among the President's points, the self-liquidating aspect of wholesale "tree planting—re-forestation" is a rather far cry into the future. Reclamation of additional farm areas and the parallel slogan for the overcrowded cities, "back to the land," has hardly its former appeal, when now granaries of the country are bursting with ever increasing agricultural surpluses.

Assuming that unemployment should be tackled from as many warranted angles as possible, the writer suggests federal aid in the rehabilitation of that greatest of potentialities, railroad buying, as a self-liquidating boost to unemployment, next at least to agriculture. Mining, conversion and fabrication of metals —steel—into its varied utilities is the most closely allied to civilization and human progress. Beginning with the massive locomotives and rolling equipment of passenger and freight cars, and all through the whole gamut of steel rails, joints, frogs, switches, bolts and spikes, ending perhaps with paper and envelopes, the vast railroad buying has lamentably withered.

Having first for the time being provided against receiverships for the railroads, let the R. F. C. continue its loans to them, not to swell bank vaults for meeting bond maturities or payments of interest, but wholly to replenish sorely needed equipment of all kinds. Directly or indirectly about every industry would be benefited, and that immediately.

In railroads neglected maintenance is recovered only at double the cost of regular proper upkeep. It is impossible to conceive of that great basic necessity, the railroads, within any present vision being wholly displaced by any other forms of transportation. It is doubtful if federal aid can be more quickly and economically helpful to unemployment than the suggested upbuilding of the nation's greatest industry.

F. C. STOWELL.

NEWS

Rail Problem Transcends Depression, Says Dunn

Permanent needs must not be overlooked in efforts to meet present emergency

There are two aspects of the railroad situation which must be considered if any real solution is to be found, according to Samuel O. Dunn, chairman of the Simmons-Boardman Publishing Company and editor of the *Railway Age*, in an address before an open forum of the Union League Club of Chicago on April 24. One problem that must be considered, he said, is the emergency raised by the depression. The other is the problem that affected the railroads before the depression began, and is likely to affect them after it is ended. "If we do not clearly distinguish between these two problems," he continued, "we shall probably adopt measures to deal with the emergency problem which will greatly increase the difficulty of solving the more permanent and important problem. The emergency problem is to prevent the railroads from having to continue to make drastic retrenchments in purchases and employment which help to depress general business, and to save most of them from going into bankruptcy."

Mr. Dunn said the reason why many railroads are either threatened with bankruptcy, or already involved, is that the decline of about 50 per cent in gross revenues in the last four years has rendered it impossible for them to earn the interest on their bonds and other fixed charges. He listed a number of steps being taken to aid the roads, including the passage of the recent Bankruptcy Act and a proposal for a government co-ordinator. He said these steps should be helpful, but they should be accompanied by a substantial reduction in wages.

He asserted that the adoption of the proposed six-hour working day would both protract and intensify the emergency in the railroad industry, saying that on the basis of the number of employees and the daily rates of pay in 1932, such legislation would increase annual railway operating expenses $414,000,000, and that on the basis of the number of employees and daily rates of pay in 1930 it would increase annual railway operating expenses $630,000,000.

In conclusion he said, "If the railroad problem, which transcends the present emergency, is to be satisfactorily solved, not only must emergency legislation which would tend to prevent its solution be avoided, but broad and constructive legislation must be enacted to establish terms of competition fair to the railways and to increase the flexibility of both regulation and management. The railroad industry is subject to great fluctuations of its business and to inflexible regulation, inflexible wages, large inflexible capital costs and inflexible rates; these, in the face of a great decline of traffic and earnings, are responsible for the present railroad crisis and must be better avoided in future if frequent similar crises are to be avoided."

Rock Island's Costly Barge Terminal Experiment

When the federal barge line corporation decided a terminal was needed in the cluster of cities consisting of Davenport, Iowa, and Rock Island and Moline, Ill., it painted a glowing picture. Estimates of the amount of freight likely to be handled convinced General Ashburn and his staff that the venture would prove highly profitable to the municipality engaged in it. A feverish quarrel ensued between the three cities. Committees of business men, lawyers, mayors and chamber of commerce officials wore a path to Washington. Each town wanted that terminal. General Ashburn finally selected Rock Island as the logical site. A bond issue of $380,000—which is a large amount in a community of 35,000 people—was floated. Of that amount, $22,000 was paid as a fee to the corporation engineer in charge of construction. When the terminal was completed, they had to wait two weeks to get together a mixed cargo with which to load the barge waiting to inaugurate it.

Under the terms of the lease, the Waterways Corporation was to pay the city fifteen cents for each ton of freight handled. In 1931, the city received a gross revenue of $1,718, while its interest and principal retirement needs were $29,215. In 1932, the gross revenue shrank to $1,228, although $35,471 was required to redeem the city's pledges. Insurance alone was more than half the gross receipts. Other cities have become somewhat dubious of General Ashburn's estimates.

John Alroy in The American Mercury.

New York Offices of Great Northern and Burlington in New Location

The New York executive and financial offices of the Great Northern, the Chicago, Burlington & Quincy; the Colorado & Southern and the Ft. Worth & Denver City will, after May 1, be located at 2 Wall street. These offices have been located at 32 Nassau street.

Lee Sees Co-ordinator as Emergency Expedient

Pennsylvania vice-president thinks consolidation will be feature of permanent relief plan

That the proposed federal "co-ordinator" for railroads is to be regarded as a temporary or emergency expedient is the opinion of Elisha Lee, vice-president of the Pennsylvania, who, in a recent address at the Harvard Graduate School of Business Administration, expressed his further belief that "we are going to proceed, perhaps rather rapidly, with a re-grouping and consolidation of the railroads either along the lines of the National Transportation Committee's broad suggestions, or those of the Prince plan, or some combination or modification of the two."

"When a final consolidation plan is adopted and is actually working out it would seem to me that the need for a co-ordinator would no longer exist," Mr. Lee explained.

While he would venture no definite appraisal of the relative merits of the two consolidation plans Mr. Lee did reveal that he has been favorably impressed by what he has read of the Prince plan, "particularly its feature of providing seven systems instead of an ultimate single system, as suggested by the National Transportation Committee."

The bulk of Mr. Lee's address, aside from his suggestion that public funds for unemployment relief might well be expended for grade crossing eliminations, was devoted to comment on the report of the National Transportation Committee and discussion of the advantages of railroad consolidation. He stated it to be his belief that economies in railway operation "have been carried very nearly, if not quite, as far as it is possible to go under the existing system of the competitive operation of freight and passenger trains." He therefore suggested that, if this view be correct, "the hope of the further economies and the still greater efficiency which are necessary to give the public cheaper transportation lies in greatly reducing or perhaps in entirely eliminating, the duplication of facilities, personnel and service which exist at the present time, and which are necessarily inherent in methods of railroad operation developed to meet the requirements of highly competitive practices."

To illustrate the set-up which he had in mind Mr. Lee cited a recent study by the Pennsylvania's traffic department which revealed that published tariffs carry today the following numbers of competitive or op-

(*Continued on page 642*)

Hearings Begun by I. C. C. in Freight Rate Inquiry

Case is being heard by Division 8, consisting of commissioners Aitchison, Lee and Porter

Hearings in connection with the Interstate Commerce Commission's investigation as to whether and to what extent, if any, general reductions should be made in railroad freight rates were begun on April 24 at Washington before Division 8 of the commission, which was created to conduct these hearings, consisting of Commissioners Aitchison, Lee, and Porter. The hearing was opened under unusual circumstances. The investigation was initiated following the filing with the commission of a "memorial petition" by organizations representing producers of agricultural products, coal, and lumber, who took the position that freight rates had been thrown out of line by reason of the drop in commodity prices and should be reduced but before the proceeding had started Congress had made considerable progress toward the passage of an administration bill design to raise the prices of farm products and an amendment had been offered, also with administration endorsement, to authorize the President to inflate the currency with a view to increasing prices generally.

The commission's main hearing room was crowded to overflowing at the opening but the attendance dwindled somewhat after a meeting of shippers' representatives had been held to organize a steering committee and select spokesmen for various groups in an effort to reduce the volume of similar testimony. John D. Battle, traffic manager of the National Coal Association, the first witness, presented a general statement on behalf of the bituminous coal industry accompanied by a number of exhibits, and the remainder of the day was occupied by other witnesses representing various local groups in the industry.

Mr. Battle said it was his contention that the general level of bituminous coal rates throughout the United States is unreasonably high and out of line with economic conditions prevailing during the past several years. "To state the matter simply," he said, "in our opinion the present level of bituminous coal rates is more than the traffic will bear." He said that approximately 96 per cent of the bituminous coal produced in the country comes from mines located on the rails of 37 railroads and represented from 39.2 per cent in 1928 to 47.3 per cent in 1932 of all revenue tonnage handled by these roads, and that if the coal tonnage is to be retained by the rail lines "we have got to have help from the railroads by way of decreased transportation charges."

The coal witnesses were to be followed by representatives of the lumber industry but they were not prepared to proceed on Tuesday and it was necessary to take an adjournment until the following day. This elicited a lecture from Commissioner Aitchison, who said that the shippers had urged an expedited hearing.

The commission has denied the petition filed by the National Lumber Manufacturers' Association, the National Coal Association and others for a reconsideration and cancellation of the permissive authorization it had given for the continuation until September 30 of the emergency freight surcharge.

Southern Pacific Salaries Cut

The Southern Pacific will place in effect on May 1 a further reduction of 10 per cent in salaries of all officers receiving over $4,200 a year.

Bill To Reduce Hours Of Service

Representative Wood, of Missouri, has introduced a bill, H. R. 5207, to amend the federal hours of service law to reduce from 16 to 12 the number of hours during which trainmen may be continously on duty.

Pension Bill Re-Introduced

Senator Wagner, of New York, has reintroduced as S. 1529 his bill to provide a system of retirement insurance for railway employees on which hearings were held in the last session of Congress.

C. & E. I. Train Renamed "Century of Progress"

The Chicago & Eastern Illinois has renamed its Chicago-St. Louis daylight train the "Century of Progress" in honor of the Century of Progress Exposition to be opened at Chicago on June 1.

F. E. C. Installs Delivery Service at St. Augustine

The Florida East Coast has recently inaugurated delivery services at St. Augustine, Fla., for l. c. l. freight originating in Jacksonville, Fla. The plan does not involve a pick-up service at Jacksonville.

I. C. C. To Investigate Florida Rates

The Interstate Commerce Commission has ordered an investigation of the situation arising from the refusal of the Railroad Commissioners of the State of Florida to permit the continuation of the emergency freight surcharge for intrastate traffic after April 24.

I. C. C. Waives Valuation Requirements

The Interstate Commerce Commission has issued an order waiving, so far as the year 1933 is concerned, the requirements of its valuation orders Nos. 4 and 22, relating to reports of inventories of materials and supplies.

March Locomotive Shipments

March shipments of locomotives from principal manufacturing plants, as reported to the United States Department of Commerce, totaled two locomotives as compared with seven in February and three in March, 1932. Both locomotives shipped in March were electrics as were the seven shipped in February. Unfilled orders at the end of March totaled 69 locomotives as compared with 65, at the end of February and 169 at the end of March, 1932. These figures do not include data on locomotives built by railroads in their own shops.

Sharp Reduction Proposed in I. C. C. Appropriations

Total of $5,040,000 compares with one of $7,137,639 allowed in previous bill

A sharp reduction in the appropriations for the Interstate Commerce Commission for the fiscal year 1934 was proposed in the President's budget message to Congress on April 20 on the independent offices appropriation bill. The recommended total for the commission was $5,040,000 as compared with $7,137,639 in the bill which was passed in March but which President Hoover failed to sign. The latter figure had represented a reduction of $2,274,834 as compared with the amount appropriated for 1933.

The biggest reduction was made in the amount recommended for the Bureau of Valuation, $1,000,000, as compared with $2,313,542 in the earlier bill and $2,750,000 appropriated for 1933. For general administrative expenses the recommendation was $2,250,000, as compared with $2,360,000 in the earlier bill; for the Bureau of Accounts, $750,000 instead of $992,267; for safety, $445,000 instead of $469,777; for locomotive inspection $435,000 instead of $457,457; for signals and train control, $35,000 instead of $37,283; and for printing and binding $125,000 instead of $175,000. The reductions in valuation and accounting were made largely in view of the prospect of a repeal of the recapture clause, but the other reductions are represented mainly by the 15 per cent reduction in government salaries and the failure to fill vacancies as they occur.

The Railway Labor Executives' Association on April 20 left at the White House a vigorous protest against the reported plan for dismembering the Interstate Commerce Commission by transferring its bureaus of statistics, accounts, service, locomotive inspection, safety and finance to a bureau in the Department of Commerce, declaring that the powers of the commission have been developed during the last 45 years "to meet clearly defined needs" and that the functions of the various bureaus have been so interrelated in the law and in its administration that "the drastic separation of those bureaus from the commission will seriously injure the efficiency of the bureaus and the commission itself." The statement made the point that the physical separation of the bureaus from the commission would make it more difficult for the commission to have ready access to the records of the bureaus and would immediately destroy the immediate and intimate contact between the officers and employees of the bureaus and the members of the commission. It was also stated that the transfer of control of these bureaus from a continuing independent body, such as the commission, to the supervision of a cabinet officer of uncertain and unlimited tenure, "will be destructive of both efficiency and that independence of political control which is essential to the effectiveness of the Interstate Commerce Commission and all these activities so closely related to the regulation of interstate transportation".

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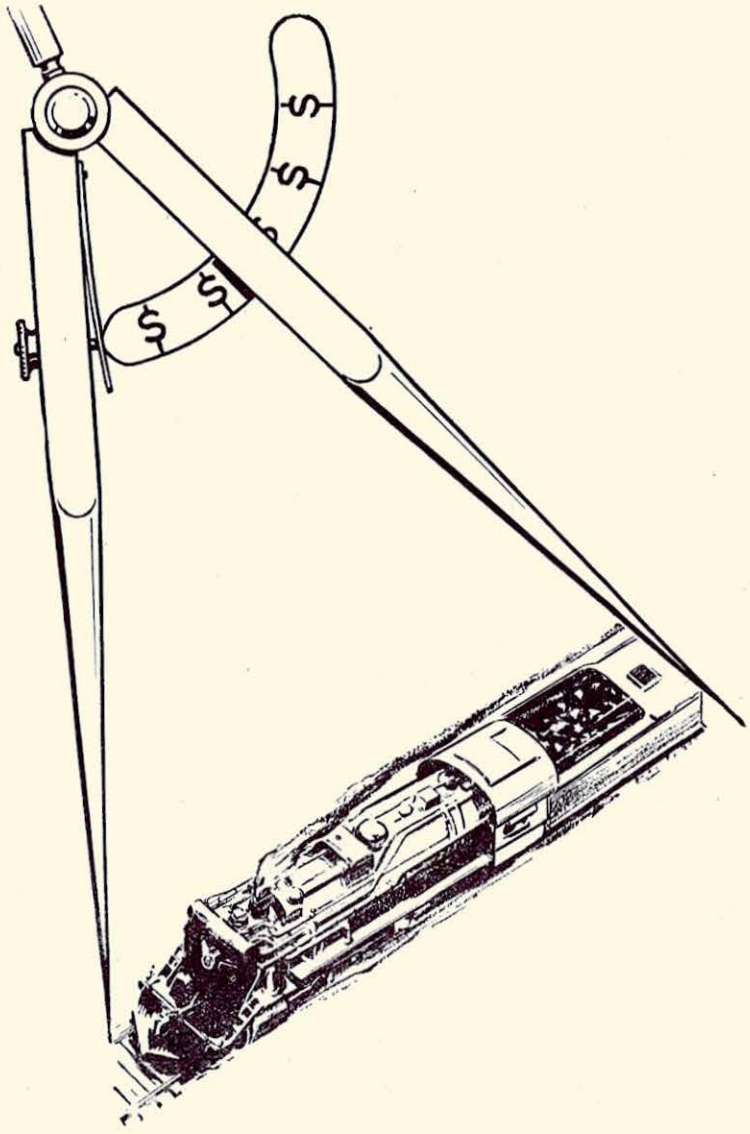


HOW
DO YOUR LOCOMOTIVES Measure Up?

The railroad that congratulates itself on possessing "serviceable" locomotives is thinking in terms of the past.

The older locomotives may be in good mechanical condition. But if they fail to measure up to the performance of the modern Super-Power Locomotive they are money wasters, exacting a continuing excess charge on the production of transportation—**they are obsolete.**

LIMA LOCOMOTIVE WORKS INCORPORATED

LIMA LOCOMOTIVE WORKS, Incorporated • • LIMA • OHIO

Beer Increases Sand Shipments

Concrete evidence of the effect of legalized beer on railroad traffic is found at Klondike, Mo., on the Missouri-Kansas-Texas, where the normal movement of glass sand of six or eight cars a month increased to 168 cars by the end of March. Silica rock, known as St. Peter sand, found at this place, is used in the manufacture of glass bottles for the breweries.

Joint Bureau For Inspection of Perishable Freight

The committee on preventable competitive waste of the Eastern Presidents' Conference has evolved a plan for the establishment of a joint bureau for the inspection of perishables at produce terminals in New England, Trunk Line and Central Freight Association territories. The plan contemplates that the Bureau will be in operation by July 1.

Competition Reduces Even Pooled Passenger Service

The Great Northern, the Northern Pacific, and the Oregon-Washington have applied to the Interstate Commerce Commission for authority to modify the contract under which the roads pool passenger train service between Portland and Seattle. Because of the amount of traffic taken by parellel bus service, carrying passengers at approximately one cent a mile, it is proposed to reduce the number of joint trains from five a day in each direction to three.

Katy Offers Free Ride to World's Fair

A prize of a ten-day visit at the Chicago Century of Progress Exposition with all expenses paid is being offered by the Missouri-Kansas-Texas to the high-school student in the territory served by that road, who submits the best essay on "The Future of the Southwest," in a contest now being conducted by the railway. All essays must be postmarked not later than May 15. In addition to the first prize, there will be a second prize of free transportation to Chicago and return and twenty honorable-mention prizes of $5 each.

Nearly Perfect Train Operation

On the Pennsylvania's New York division and the Long Island, which together comprise the New York Zone, the record for the month of March shows 99.6 per cent of the regular passenger trains on time; the best month ever recorded. The total number of scheduled trains run was 50,437, making an average of only six trains a day reaching destination behind time—about four in one thousand. There were also operated 5,767 extra passenger trains. The statement gives the principal causes of delays as inclement weather, grade crossing and other accidents, delays at drawbridges, and congestion at stations.

Commuters Object To Increased Fares

The Metropolitan League of Erie Commuters has filed a complaint with the Interstate Commerce Commission attacking an increase described as amounting to 15 per cent in the commutation passenger fares in the New York district of the Erie made effective on January 1. The complaint states that the net purchasing power of the commuters has been greatly reduced and objection is made on the ground that commuters are being discriminated against by a reduction in round-trip fares applied to suburban points at about the same time as the increase in commutation fares.

Glacier Park Bus Detour

Rail travelers on transcontinental trains will be afforded an opportunity to make a one-day motor coach detour over Going-to-the-Sun highway, a 50-mile scenic motor road skirting Face-of-Sour-Spirit-Who-Went-Back-to-the-Sun-After-His-Work-Was-Done mountain in Glacier National Park upon the completion of the highway in July. Access to the interior of the park in past years has been only by saddle horse, afoot, or at places, by motor launch. The new highway will be the first to penetrate the rugged interior of the park, which the national park service has endeavored to keep in its wild, primitive state.

Club Meetings

The Canadian Railway Club will hold its next meeting at the Windsor Hotel, Montreal, on Monday evening, May 15. A. J. Tonks, C.P.R., Vancouver, will present a paper on unemployment insurance.

The Pacific Railway Club will hold its next meeting at the Transportation Club, Palace Hotel, San Francisco, on Thursday evening, May 11. Duties and responsibilities of the railway station agent will be discussed by J. G. Dahlstron, (Southern Pacific), A. F. Hunt (Atchison, Topeka & Santa Fe) and George Keyes (Western Pacific).

New Santa Fe Train

The Atchison, Topeka & Santa Fe on April 23 established a new train, The Ranger, between Chicago and Galveston, Tex. It will provide faster service between Chicago and Kansas, Oklahoma and Texas points. The train leaves Chicago at 8 p. m. and arrives in Galveston at 9:35 a. m. the second day; returning, it leaves Galveston at 7:45 p. m. and arrives in Chicago at 10:45 a. m. This train also carries cars from Denver, Colo., for Galveston. Cars leave Denver at 8:45 p. m. and connect with The Ranger at Newton, Kan., at 12:10 p. m. the next evening. Returning from Galveston, the cars arrive in Denver at 9:50 a. m.

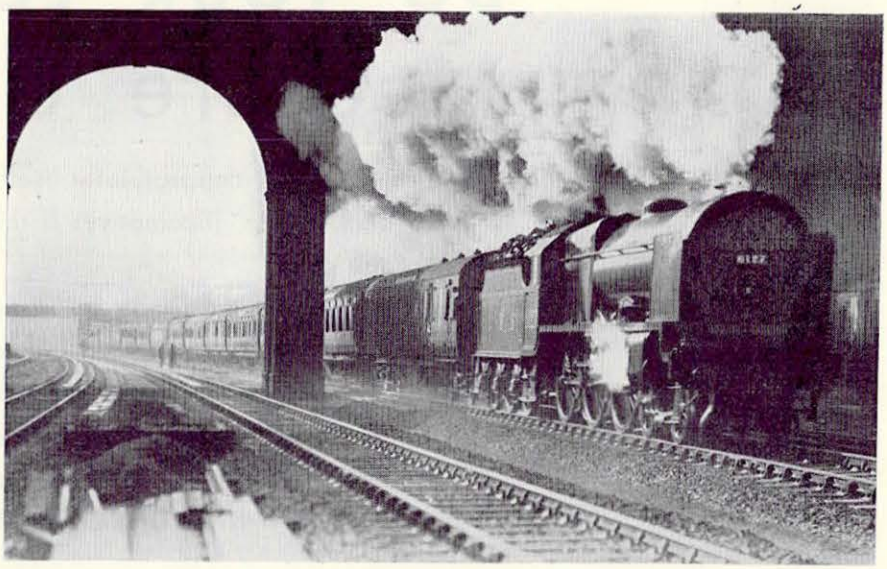
Strathcona Fellowships

Yale University, New Haven, Conn., has awarded five fellowships in transportation as provided for in the bequest of Lord Strathcona. The five men, all of whom have had railroad experience, two of them being third-generation railroaders, are: R. A. Emerson, Morden, Manitoba; S. M. Gossage, Montreal; T. M. C. Martin, Warsaw, Wis.; P. E. Savage, Montreal, and L. R. Shellenbarger, Hopkins, Minn. Candidates from Canada and the northwestern part of the United States, subject to certain rules, are given preference. All of the present recipients are University graduates.

The Department of Transportation at Yale, of which the head is Professor W. M. Daniels, gives instruction in all the different problems of railroad transportation. R. B. Stoeckel, commissioner of motor vehicles for the State of Connecticut, is now associated with the University as honary research associate in transportation.

The Royal Scot in America

The Royal Scot, the British train which is to be exhibited at the Century of Progress Exposition in Chicago, by the London, Midland & Scottish, has arrived at Montreal and will be on exhibition in New York City, May 12 and 13; first at the Grand Central Terminal and then at the Pennsylvania Station. A month is to be spent in touring American and Canadian cities. The engineman in charge of the locomotive is William Gilbertson. In recognition of American regulations the locomotive will be fitted with a bell and an electric headlight.



The "Royal Scot"

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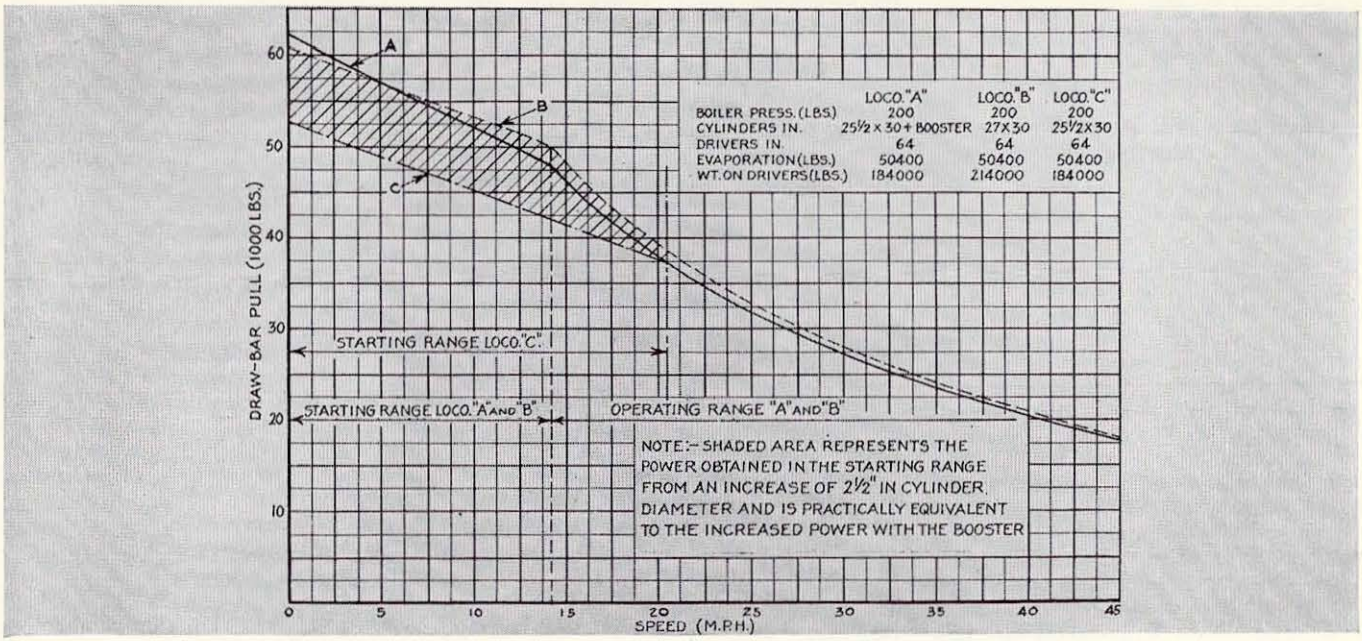
This Flexible POWER COMBINATION Means *Lower* Maintenance


DRAW-BAR PULL (1000 LBS.)
SPEED (M.P.H.)
A
B
C
STARTING RANGE LOCO."C"
STARTING RANGE LOCO."A" AND "B"
OPERATING RANGE "A" AND "B"
NOTE:- SHADED AREA REPRESENTS THE POWER OBTAINED IN THE STARTING RANGE FROM AN INCREASE OF 2½" IN CYLINDER DIAMETER AND IS PRACTICALLY EQUIVALENT TO THE INCREASED POWER WITH THE BOOSTER
LOCO."A" LOCO."B" LOCO."C"
BOILER PRESS.(LBS.) 200 200 200
CYLINDERS IN. 25½ x 30 + BOOSTER 27X30 25½X30
DRIVERS IN. 64 64 64
EVAPORATION(LBS.) 50400 50400 50400
WT.ON DRIVERS(LBS.) 184000 214000 184000

THERE is a maintenance advantage to incorporating The Locomotive Booster as an integral part of the locomotive.

Maintenance is roughly proportional to the work done. Without The Locomotive Booster larger cylinders must be used to get the power required. But when that maximum demand lessens, the large cylinders must still be used to get the train over the road.

Contrast this with a design embodying smaller cylinders plus The Locomotive Booster to secure the desired maximum tractive effort. If The Locomotive Booster were worked continuously there would be no maintenance economy. But except at peak load The Locomotive Booster is inoperative and the smaller cylinders do the work. Since less work is done, maintenance is lowered.

In addition, the combination of smaller cylinders and The Locomotive Booster reduces the weight of the main engine by 25,000 lbs. or more—another important economy.

FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK CHICAGO MONTREAL

B. & O. Authorized To Reduce Fares

The Interstate Commerce Commission has authorized the Baltimore & Ohio to establish reduced fares of two cents a mile in coaches and three cents a mile in sleeping and parlor cars, on short notice, between Cincinnati, Louisville, and St. Louis and intermediate points. It had previously denied a fourth section application to make the reductions without applying them at intermediate points.

The Pennsylvania and New York Central has protested against the reduction by the B. & O., saying that the fares proposed by it were lower than were necessary to meet the competition set by the Louisville & Nashville and would tend to break down the fare structure in the territory.

Purchases and Stores Division Meeting

The annual convention of Purchases and Stores Division, A. R. A., will be confined to a meeting of the general committee and chairmen of subject committees at the Stevens Hotel, Chicago, Monday, June 26, according to the announcement of Secretary W. J. Farrell. Plans for the convention have been abandoned in view of economic conditions. A. G. Follette, general material supervisor of the Pennsylvania and C. M. Woodward, in the purchasing department of the Pennsylvania, have been announced as winners in the annual contest held by this Division for papers on Railway Purchasing and Stores Work. It is expected that these papers entitled "Energizing the Supply Dollar" and "Direct Results from Indirect Purchases", respectively, will be presented at June meeting.

Flashing Signals Ordered at Watertown, N. Y.

The Public Service Commission of New York, reporting on the highway crossing at Bradley street, Watertown, on the New York Central, decides that for the present the public welfare does not require elimination of the grade crossing; but the road has been directed to install flashing-type automatic signals at its own expense.

This is a crossing of an important street and it has been the scene of 11 accidents in seven years, though most of these accidents have been caused by drivers running into the sides of slow moving trains. The city authorities prefer to have a certain other grade crossing eliminated before taking action concerning Bradley street. Commissioner VanNamee dissented from the decision of the commission, holding that the railroad company ought not to be required to install signals at its own expense.

Wage Hearings in Canada

Submitting that the need to bring down railway operating costs and the need to improve railway credit not only in the interests of the railways and the country, but in the best interests of all classes of employees is apparent, the Canadian Pacific and Canadian National Railways in Montreal last week contended before the board of conciliation and investigation appointed to settle the railway wage dispute that the proposed "moderate and reasonable" further reduction of ten per cent in train and engine service wage rates should receive approval.

Matching the 28-page memorandum which the unions submitted to the board with a 27-page rebuttal, the railway companies surveyed the argument put up by the union representatives and dealt at great length with every aspect of the case, including that of the present agreement, comparison with wage rates in the United States, the sharing of employment, the cost of living, motor vehicle competition, the purchasing power of wage rates, and unemployment.

Leonor F. Loree Honored

Leonor F. Loree, president of the Delaware & Hudson, was the guest of honor at the ninth annual dinner meeting of the American members of the Newcomen Society, held at the Engineers' Club of New York, Monday evening, April 24. The purpose of this society is the study of the history of engineering and technology, and Mr. Loree is one of the pioneer members of the society in the United States. In his remarks he traced the early development of the application of steam to the locomotive, climaxing his talk with information about the operation of the new Delaware & Hudson locomotive, which is the first application of triple expansion to the locomotive. A paper on The Genesis of the Multiple Unit System of Train Control was presented by Dr. Frank J. Sprague, and Prof. Robert G. Albion of the Department of History at Princeton University, spoke on The Communication Revolution, 1760-1833. Professor Albion's discussion was largely in the nature of an interpretation of the effects of improved transportation and communication upon our social, political and economic life.

Getting Down to the Minimum

Dealing with Cherryplain, a small station on the Rutland, 30 miles north of Chatham, the New York state public service commission, authorizing a less expensive service at the station, explains to the public that the deficit of the company calls for severe retrenchment; but tells the road that the request for authority to shut up the station cannot be granted. The conditions, however, are made as easy as possible. Approving its inspector's report, the Commission's statement says: "The company has been ordered to employ a caretaker at this station. The caretaker shall be on duty at least one hour a day and such hour is to include a period of fifteen minutes before the arrival of any passenger train which stops on signal at the station. (There is one train a day each way.) Inbound and outbound carload freight will continue to be handled. * * * If the petition is granted in full the saving to the railroad company would be comparatively small and the evidence indicated that the closing of the station would be an inconvenience to some. This is partly because the nearest stations are a considerable distance away, the nearest to the north being Berlin, 4½ miles away and the nearest to the south being Stephentown, more than six miles away. * * * It was concluded that the hours of service of the caretaker could be shortened and it was also concluded that the heating of the waiting room in the station is not required."

New York and Chicago, 17¾ Hours

The announcements of the Pennsylvania and the New York Central, setting forth numerous changes in the timetables for April 30, when daylight saving goes into effect in many cities, tell of slight changes in the times of a number of through trains between New York and the West. The 18-hour trains are to be run through in 17 hours, 45 minutes, on both roads. The Broadway Limited will leave New York at 4 p. m., eastern standard time, and, eastbound, leave Chicago at 2 p.m., central standard time; the Twentieth Century Limited will leave New York at 3:15 p. m. and, eastbound, leave Chicago at 1:15 p. m. The time between New York and St. Louis will not be changed materially, westbound, but eastbound the "American" of the Pennsylvania will arrive in New York at 8:35 a. m. instead of 9.02 a. m.; the Spirit of St. Louis will arrive at 11:45 instead of noon and the Gotham Limited at 6:30 p. m. instead of 7. The Exposition Flyer of the New York Central, eastbound, will run 30 minutes faster than now, arriving at 7 p. m. The Lake Shore Limited, westbound, will likewise save 30 minutes. The Genesee, of the New York Central, leaving New York at 11:45 p. m., will arrive at Buffalo at 8:35 a. m., one hour faster than heretofore.

Railroads Haul Less Perishable Farm Produce

Railroads and boat lines hauled 517,656 carloads of 19 kinds of fresh fruits and vegetables to 66 leading consuming markets in 1932, as compared with 613,138 carloads in 1931, and 626,596 carloads in 1930, according to the U. S. Department of Agriculture. No computation is made of less than carlot business. Unloads of potatoes in the 66 cities totaled 116,708 cars last year, against 140,289 cars in 1931, and 147,758 cars in 1930; oranges 65,406 cars in 1932, against 71,101 cars in 1931, and 51,234 cars in 1930. Apples were third, with 44,593 cars in 1932, against 50,640 cars in 1931, and 52,486 cars in 1930; grapes, 38,317 cars in 1932, and 37,482 cars in 1931.

Carlot unloads of 19 fruits and vegetables in New York totaled 115,741 cars last year, compared with 133,375 cars in 1931, and 137,206 cars in 1930; in Chicago, 50,662 cars last year, against 61,259 cars in 1931, and 61,845 cars in 1930; Philadelphia, 34,570 cars last year, against 39,182 cars in 1931, and 41,567 cars in 1930; Boston, 33,947 cars last year, against 35,345 cars in 1931, and 34,317 cars in 1930.

The bureau reports that motor trucked receipts of 19 commodities at Philadelphia last year totalled 18,531 cars compared with 15,077 cars in 1931; at Boston, 5,236 cars last year against 4,355 cars in 1931; Los Angeles, 27,874 cars last year against 25,879 cars in 1931, and at three markets in New York—Washington Street, Wallabout, and Gansevoort markets—26,453 cars last year against 19,411 cars in 1931.

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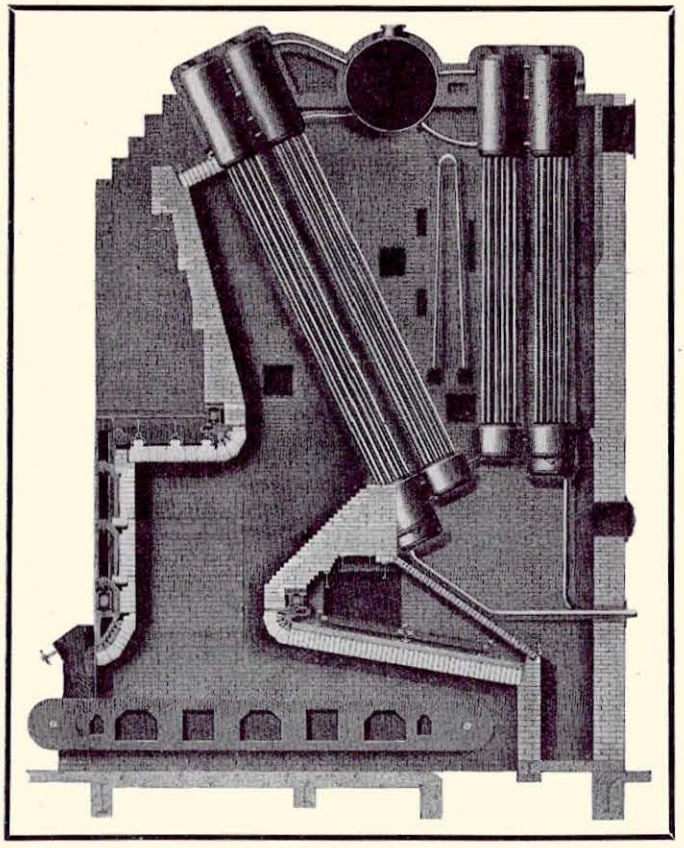
THERE'S MORE TO SECURITY ARCHES THAN JUST BRICK



Modern installation of chain grate stoker with American suspended arches and American sectionally supported air cooled front and side walls designed for burning lowest grade anthracite screenings.

INDUSTRY, TOO, Has Its ARCH Problems

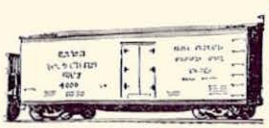
American Arch Company's reputation as combustion specialists has spread thru all industry.

Heating furnaces in the country's greatest steel plants have roofs designed by American Arch Company experts.

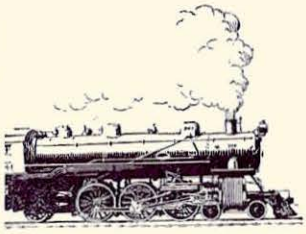
Oil still arches and air-cooled side walls by American Arch Company are used in the leading oil refineries. The largest units in the world are so equipped.

Boiler furnaces have turned to American Arch Company for air-cooled side walls and arches, including the biggest units of any railroad power plant.

Everywhere throughout industry combustion problems of this nature are being brought to American Arch Company.



Meanwhile the railroads are still getting this counsel as part of the complete service on Arch Brick that is rendered by American Arch Company.



AMERICAN ARCH COMPANY

INCORPORATED

NEW YORK CHICAGO

Railway Tie Association

The fifteenth annual convention of the Railway Tie Association will be held at the Jefferson Hotel, Richmond, Va., on May 10 and 11, with S. S. Watkins, vice-president of Joyce-Watkins Company, presiding as president. The program will include the following features:

Wednesday

Opening exercises.
Report of president.
Report of Committee on Statistics, E. J. Stocking, sales manager, Hobbs-Western Company, St. Louis, chairman.
Report of Committee on Standard Plan for Adzing and Boring Ties, W. J. Burton, assistant to chief engineer, Missouri Pacific, St. Louis, chairman.
Address on "What the Buyer of Ties Expects from the Seller," by D. C. Curtis, chief purchasing officer, Chicago, Milwaukee, St. Paul & Pacific, Chicago.
Address on "For the Common Good of Tie Producer, Preserver and User," by R. S. Belcher, manager treating plants, Atchison, Topeka & Santa Fe, Topeka, Kan.
Address on "Balancing the Budget of Supply and Demand in Crossties," by Dr. Julius H. Parmelee, director of Bureau of Railway Economics, Washington, D. C.

Thursday

Report of Committee on Transportation, John Wright, Ayer & Lord Tie Company, Louisville, Ky., chairman.
Report of Committee on Utilizing Ties in Grade Proportions Normal to Woods-Run Production and Standardizing Tie Lengths, A. R. Fathman, vice-president, Hobbs-Western Co., St. Louis, chairman.
Address on "Why Close Adherence to Standard Tie Specifications Pays from the Producers' Standpoint," by O. L. Massey, Ayer & Lord Tie Company, Memphis, Tenn., chairman.
Address on "Splitting of Ties," by R. R. Poux, chief treatment inspector, Erie, Cleveland, Ohio.
Address on "Advantages to Tie Producers from Advance Knowledge Regarding Future Purchases by Railroads," by J. J. Schlafly, president, Potosi Tie & Lumber Co., St. Louis, Mo.
Address on "Industrial Ties," by H. B. Kehoe, Gillis & Co., Chicago.
Address on "Ten Years of the Standard Tie Specifications," by E. E. Pershall, president, T. J. Moss Tie Co., St. Louis, Mo.
Election of officers and closing business.
The annual dinner will be held on Wednesday evening.

Automatic Train Control Suspended on C. I. & L.

Acting on a petition of the Chicago, Indianapolis & Louisville, the Interstate Commerce Commission, Division 6, on April 17, suspended the requirements of its automatic train control orders, as related to this road, until further order.

Under the first order the Sprague system was installed between South Hammond, Ind. and Monon, 64 miles (32 locomotives). On application of the road in April, 1927, the commission authorized the removal of the Sprague and the installation of the General Railway Signal Company's apparatus in lieu thereof; and under the second order the G. R. S. system was installed between Monon and Indianapolis, making a continuous installation of one system from Hammond to Indianapolis, 160 miles; and a total of 50 locomotives were equipped.

The present petition gives the usual reasons for desiring to suspend A. T. C.—low earnings, light traffic, unfavorable operating conditions, etc. The gross income of the road has gradually fallen off from about four million dollars annually in 1925 to about one million in 1932; and for the last three years there has been a large deficit. The territory in which this line lies is favorable to the visibility of roadside signals. During the past 20 years, no passenger or employee has been killed as a result of collisions which might have been prevented by A. T. C., except one collision in 1931. The apparatus has operated satisfactorily and has afforded some additional factor of safety, which, however, was not commensurate with the expenditures. For the first nine months of 1932, these expenses have been abou. $1,000 a month. For the past ten years very few, if any, new enginemen have been employed and the present force is, therefore, comprised of men of long experience, with high standards of efficiency.

The company's petition is granted, but on condition that certain special safeguards installed at crossings at Monon and Frankfort, when A. T. C. was introduced, shall be continued in connection with the visual wayside signals. This will involve an expenditure of $600.

Look to Railroads for All Transport Service, Says Vermont Board

"It is to the railroads that the people should look for a complete transportation service," including supplemental service by truck, said the Public Service Commission of Vermont, in a recent opinion authorizing the Boston & Maine Transportation Company to install motor truck service between White River Jct., and Woodstock, Vt. The new service, which supplants rail services of the Woodstock Railway, was inaugurated April 15.

In awarding the Boston & Maine's highway subsidiary permission to operate this service, the Public Service Commission declared that "the general good of the state will be promoted" by having the railroad's affiliate operate this route in Vermont, rather than other applicants.

The Woodstock Railway, which operated passenger and freight trains between White River and Woodstock, serving also the communities of Quechee and Dewey's Mills, suspended service on April 1. Permission to serve these communities with a highway freight service was sought by several trucking interests.

In awarding the permission to the Boston & Maine Transportation Co., the state Commission stated, in part:

"The final question which presents itself for solution is: To which of the remaining petitioners shall the permit be issued? Obviously the intent and purpose of the Legislature in delegating to the Commission the power to regulate common carriers on the highway is to foster, safeguard, and promote the general good of the state. The promotion of the general good rather than the fostering of personal desires is the beacon which must guide the Commission in the selection of contending applicants.

"To the Commission it appears obvious that transportation being a service of vital importance to the well-being of the state its means should be correlated and that to the existing agency, the railroads, the people should look for a complete transportation service. To secure this complete transportation service the railroads should supplement carriage by rail with carriage by truck. In the present case this is what the Boston & Maine, with the approval and cooperation of the Central Vermont, petitions to do. The evidence is clear that they are equipped and organized to render this service and that they, operating through the Boston & Maine Transportation Company, are willing to extend service into this area. The Commission finds that the general good of the state will be promoted by granting the certificate to the Boston & Maine Transportation Company."

Railroad Legislation Meets Further Delay

President Roosevelt's plan of proposed legislation for the appointment of a member of the Interstate Commerce Commission as federal railroad co-ordinator, to encourage and promote or require action on the part of the carriers to avoid unnecessary duplication of services and facilities, has again encountered delays and is still on his desk. It was stated at the White House on April 21 that the bill had been finally drafted but that the President had not yet found time to prepare a message to Congress on the subject. After that his time was very fully occupied for several days with the inflation proposals and a round of conferences with the representatives of foreign governments, but on Wednesday hope was expressed that it might go to Congress on Saturday or Monday. It was also stated last week that the plan which had been submitted by Secretary Roper for the reorganization of the Department of Commerce and the Interstate Commerce Commission had been sent back to him for corrections but had been returned again. Later Mr. Roper took it back again for further study. There have been reports that some revision had resulted from protests made at the White House to the plan for transferring a large part of the commission's subordinate organization to the Department of Commerce. Commissioner Porter was one of those who called on the President to discuss the commission phase of the plan.

It is understood that the proposed bill places dependence to a large extent on voluntary co-operative action on the part of the railroads, working through regional co-ordinating committees to carry out the purposes of the plan, by making arrangements for joint use of terminals and trackage, preventing competitive rate-cutting or allowances for accessorial services, etc., so far as they can be accomplished by voluntary action, but that where legal obstances are encountered, such as the anti-trust laws, or where difficulties result from minority opposition to plans on which a majority are agreed, the federal co-ordinator could be asked to issue the necessary orders, subject to appeal to the commission. It is also believed that the powers of the co-ordinator would be stated broadly but somewhat vaguely, although they would be reinforced by his power to recommend conditions on which loans could be made by the Reconstruction Finance Corporation. One of the purposes of the plan is to bring about financial reorganization of some of the companies to reduce fixed charges, and one provision which has been considered is that the commission shall not approve a loan or authorize additional securities unless it finds that the financial structure of the carrier is such as to afford reasonable prospect that it can without reorganization survive the economic depression and provide for its capital needs

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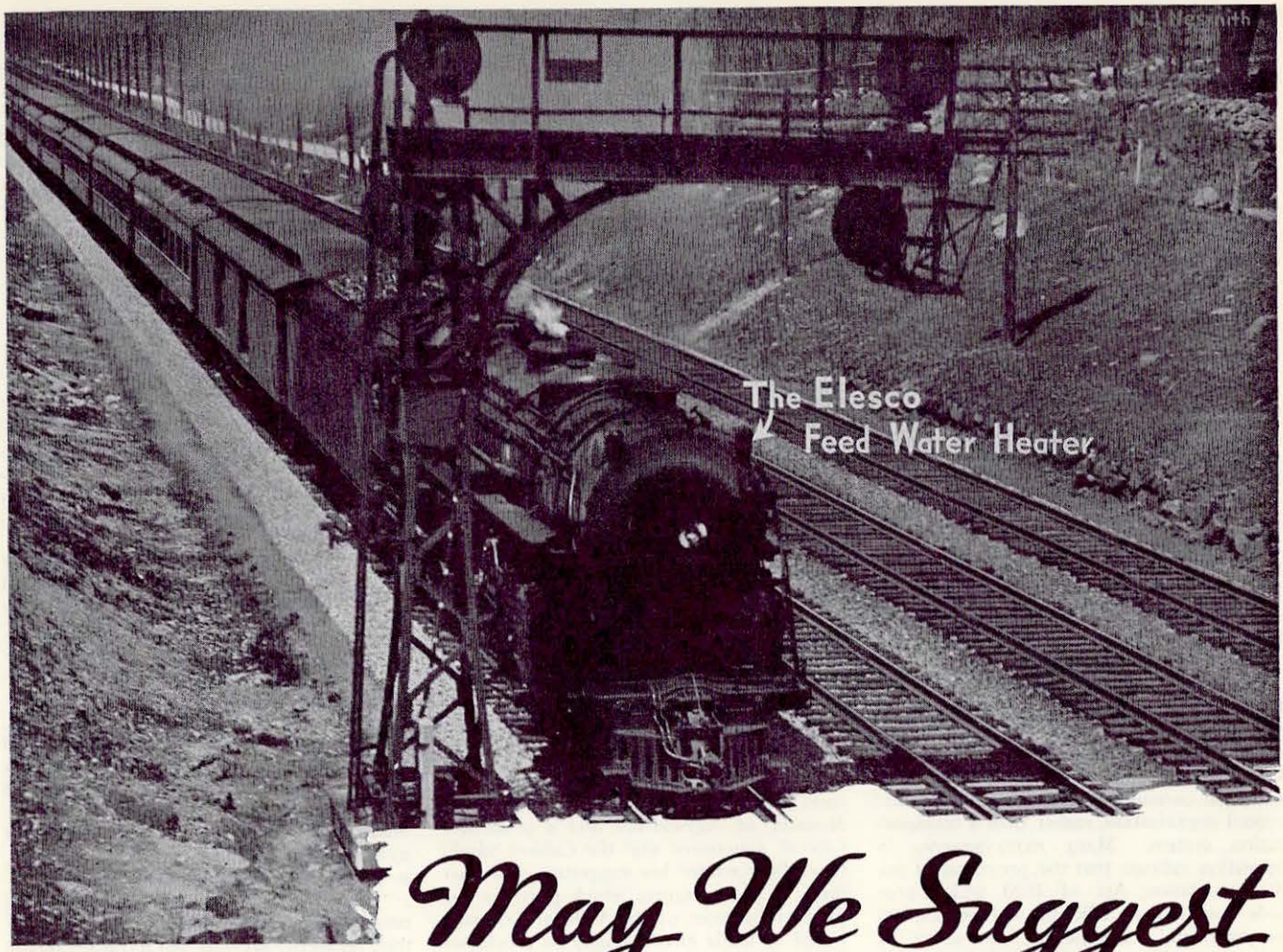

May We Suggest

A Way to Reduce the Cost of Drawbar Pull?

On a modern locomotive without a feed water heater, out of every $100 spent for fuel—

> $58 goes out the stack in exhaust steam, $35 is lost through radiation, resistance, etc., leaving only $7 transformed into work at the drawbar.

Applying an Elesco feed water heater raises the $7 figure for drawbar pull to $8 and, in some cases, more . . . . accomplished by passing a portion of the exhaust steam, otherwise wasted, through the feed water heater, where its heat is absorbed by the boiler feed water. This means a fuel saving of 12 to 15 per cent and a 15 per cent saving in water through the return of condensate to the tender.

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thereafter. No public suggestion has been made in conection with the discussion of the inflation bill that the railroads be given any of the cheaper new money to enable them to carry their existing indebtedness without reorganization.

The advisory committee of the Association of Railway Executives was called to meet in Washington on Thursday to discuss the situation.

Northwest Fruit and Produce Shippers Seek Lower Rates

Confident that the real remedy for present conditions is in the hands of the rail carriers, several organizations representing the fruit and produce industry of the Pacific northwest have forwarded to all tariff bureaus a letter requesting rate reductions which would return freight charges to parity with those in effect prior to the percentage increases of 1918 and later. The letter is signed by the Hood River Traffic Association, the Yakima Valley Traffic & Credit Association, the Rogue River Valley Traffic Association and the Wenatchee Valley Traffic Association.

The letter says in part:

"Railroads enjoyed in 1929 the highest tonnage ever offered and the fact that they were still able to show less than a fair return as set by the Interstate Commerce Commission is indicative of an attempt to make an earning on an exploited and disrupted organization, rather than a transportation system. Many extravagances in operation indicate that the provision of the Transportation Act of 1920 which provide for 'honest, efficient and economical management,' have never been given as serious consideration as has the provision calling for an adequate return on valuation.

"We know that the perishable industry, and we believe all other industries, wish for the rail carriers a square deal and a fair earning on such properties as are needed for efficient transportation. The industries which use railroad service are not responsible for excesses in construction, service and propaganda, nor for failure to meet conditions of competition where they may be met. Industries that in an effort to meet and solve their own problems find it necessary to seek other means of transport because of excessive rail rates, cannot be blamed for depleted rail revenues.

"After all, it is tonnage and not rates that brings prosperity to the railroads. Never was this more apparent than now when, with commodity prices below the standards of twenty years ago and rail freight rates on some commodities fifty per cent higher, certain commodities have practically ceased to move by rail. It is this stagnation of industry far more than competition, which has caused railroad difficulties.

"The industries which depend on railroads for transportation should and will join in a program to make all competition fair if the railroads will be fair with industry. Some industries have found their existence dependent upon finding cheaper means of transport and these cannot be expected to assist in legislating cheaper transportation off the waterways and highways until rail rates and reason meet.

"We ask for reduction in expense by the elimination of duplications of service, by absorption of subsidiary companies that reduce rail revenues, that compensation of employees in all ranks be adjusted to present conditions and official personnel be reduced to needs of efficient operation."

Those who desired to testify had asked for time totalling 30 working days but after arrangements had been made for consolidating certain testimony or shortening it by filing exhibits this was reduced to about 18 days. Those who asked for time included representatives of the state commissions, livestock, grain, petroleum and products, cotton, lumber, coal and coke, agriculture, iron and steel, scrap metals, stone and roadway materials, ore, paper, chemicals, fertilizers, soap, furniture, and cement.

Canadian Government Moderates Railway Bill

Three important steps in connection with the legislation now before the House of Commons at Ottawa, implementing the findings of the Duff Commission on the railway problem and already passed by the Senate, were made known last week in the House by Premier R. B. Bennett and Hon. Robert J. Manion, Minister of Railways. Near the end of a week of desultory debate and with part one of the bill passed the Prime Minister, in reply to a speech by Hon. W. R. Motherwell, former Minister of Agriculture and a prominent Liberal, announced that the Cabinet would carefully consider his suggestion that part three of the measure, which provides for the establishment of the Arbitral Tribunal, would be made effective only on proclamation. Earlier in the week Dr. Manion stated that in order to carry out promises made by the Ministry a clause would be added to the end of the bill doubly ensuring the people against any amalgamation of the Canadian Pacific and Canadian National, and another would be inserted providing that neither road could abandon any of their mileage without the approval of the Board of Railway Commissioners. This latter move was to meet a strong fight put up by the Liberals who feared that with the wide powers to be given in the bill to the board of trustees who will displace the present board of directors of the Canadian National branch lines might be abandoned without any reference to the Government or to Parliament, and that people in remote parts of the country who have settled because of branch line construction might be left without any access to market and without any chance to air their grievances.

A flare-up developed early last week when the Prime Minister became angered over the protracted speeches of Liberals in criticism of the bill and he charged that they were deliberately attempting to destroy the bill. Another feature of the week was a bitter attack on two occasions by Dr. Manion on an employee of the Liberal party engaged in sending out to the rural press political material. Dr. Manion charged that "lies" were being circulated, that a careful campaign to make the people believe that the present Government was trying to sabotage the C. N. R. was being waged under the aegis of the Liberal party. Then a lengthy skirmish followed a motion of Major C. G. Power, Quebec City Liberal, to the effect that the salaries of the trustees should be voted annually in the estimates of the road.

Late in the week the effect of the pooling of train services between Montreal and Toronto and Ottawa and Toronto was dealt with, Liberals expressing solicitude for the men thus thrown out of employment.

Lee Sees Co-ordinator as Emergency Expedient

(*Continued from page 637*)

tional routes between New England points and other destinations: Boston, Mass., to Chicago, 322 optional routes; Providence, R. I., to Chicago, 89 routes; Manchester, N. H., to Chicago, 157 routes; Augusta, Me., to Chicago, 147 routes; Portland, Me., to St. Louis, Mo., 1,307 routes.

"Sound railroad consolidation," Mr. Lee concluded, "is undoubtedly the basic need of transportation today, but we must carry the principle of co-ordination still further. We must bring into the picture not only the railroads themselves, but also the transportation agencies which operate on our highways and waterways, and in the air, and the steamships on the Great Lakes and in the coastal and intercoastal trades as well. Some of these are to all intents and purposes unregulated, and the others inadequately so. All should be brought under proper regulation, state and federal, in the interest of the public.

"The character of the regulation must necessarily be based on the character of their respective services, but its object should be the same as that for which railroad regulation was originally undertaken, viz., to secure to the public reasonable and stable rates, and to prevent discrimination. Regulation of the railroads has been complicated and extended far beyond these purposes, and with injurious results. Its scope should now be reduced to what is necessary for the achievement of its original and proper purpose.

"Certain forms of transportation service are today subsidized by the government. Beyond any question this is true of transportation on the artificial inland waterways and of commercial service on the highways. These subsidies should be abolished, in the case of the waterways by charging tolls, and in the case of the highways by adjusting all license fees of commercial vehicles in accordance with a sound and accurate determination of their share of highway costs, plus a proper contribution to the general tax fund.

If we attain these two ends, *i. e.*, proper and non-discriminatory regulation of all forms of transport, and the elimination of waterway and highway subsidies, we should expect the following results:

"Each form of transportation, being neither artificially encouraged by subsidies, nor artificially hampered or favored by governmental preferences as to regulation or otherwise, would naturally seek the field in which it can most effectively give the public the kind of service which the public wants, at the lowest cost. There would be little or no over-lapping of services, for without the influence of artificial aid of some kind, traffic would naturally seek the

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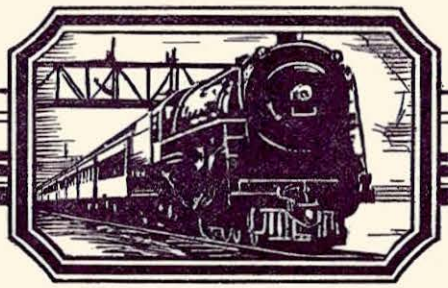

Alco Alco

TO ECONOMIZE— MODERNIZE

Aside from its inability to meet the requirements of present day freight service, much of the older motive power now owned by the railroads is becoming too expensive to maintain when measured by the standards of economy now being established by modern locomotives. Recently built locomotives of high horsepower capacity are demonstrating their ability to run in freight service between 100,000 and 150,000 miles, and in passenger service from 150,000 to 200,000 miles between heavy class repairs. The mileage of much of the motive power from ten to twenty years old cannot be stretched to exceed 50,000 and 60,000 miles.

The costliness of retaining obsolete motive power which jeopardizes the competitive position of the railroads thus becomes ever more apparent.

Once the trend of traffic becomes definitely established in an upward direction, the need for more locomotives which can meet the tests established by modern motive power, will rapidly become acute. It is not too early to prepare to meet this situation now.

American Locomotive Company
30 Church Street New York N.Y.

Alco Alco

most efficient agency and route for any given service. The various forms of service would then cease to be competitive with one another, and become supplementary to each other. Taken altogether, they would form a closely co-ordinated whole, giving to the public the best transportation and distribution system capable of being constructed out of the means at hand.

"The railroads, by reason of their superior efficiency in handling the heavier forms of transportation, which constitute the vast bulk of the nation's traffic, would be the backbone of such a system. They would no longer be railroad companies, merely, but would become general transportation enterprises, authorized by law to enter any field of service, and actively engaging in transportation by highway and by inland waterway, by the Great Lakes, by the seas between our coast ports, and by airplane. That is the picture toward which the country should look forward as an ideal, and it is perfectly capable of practical realization.

It is also highly desirable that regulation and control of all forms of transportation should be consolidated under a single branch of the government. We cannot reap the full benefits of a co-ordinated national transportation system if responsibility for regulation is divided. I am, therefore, happy to note that President Roosevelt, through his advisers, is apparently preparing to move in this direction. It will be a salutary step."

Equipment and Supplies

LOCOMOTIVES

THE WAR DEPARTMENT, office of chief engineer, Washington, D. C., will receive bids May 8 (Circular 33-29) for one 25-ton gas-electric locomotive and for six other smaller locomotives.

FREIGHT CARS

THE WILSON CAR LINES, Chicago, will construct fifty 40-ton refrigerator cars in its own shops, work to begin June 1.

THE NATIONAL POULTRY CAR COMPANY, 308 West Washington street, Chicago, recently organized to engage in the transportation of live poultry, is inquiring for 100 live poultry cars.

IRON AND STEEL

THE ERIE has asked for prices on a year's tie plate requirements. As reported in the *Railway Age* of April 15, this company has ordered 24,549 tons of rails.

THE ATCHISON, TOPEKA & SANTA FE has ordered 350 tons of structural steel for a bridge at Wichita, Kan., from the Kansas City Structural Steel Company.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE has ordered 4,700 tons of tie plates, dividing the tonnage equally among the Bethlehem Steel Company, the Illinois Steel Company and the Inland Steel Co.

Supply Trade

The Positive Rail Anchor Company, Chicago, has moved its sales office from 80 East Jackson boulevard to 332 South Michigan avenue.

C. C. Hay, secretary of the **Ingersoll-Rand Company,** New York, has been elected also a director, to fill a vacancy, and all other directors were re-elected.

C. E. Graham, handling general railway supplies, has moved his office from 370 Lexington avenue, to 61 Hudson street, New York City.

The Chicago Railway Equipment Company, Chicago, has moved its general sales office from the Railway Exchange building to Suite 1907, McCormick building, Chicago.

Morrison Metalweld Process, Inc., Buffalo, N. Y., has moved its Chicago office from its Chicago plant to the Great Northern building, 20 West Jackson boulevard.

The Safety Car Heating & Lighting Company on May 1, will move its Chicago district office from 1134 Straus building to 1455 Railway Exchange building, 80 East Jackson Boulevard. **George H. Scott,** manager, remains in charge.

The American Fork & Hoe Company, Cleveland, Ohio, has appointed **R. W. Jamison,** with office at 1222 Mission street, San Francisco, Cal., as sales agent for its Railway Appliances division products on the Pacific Coast.

H. W. Croft, of New York, has been elected a director of the **General Railway Signal Company** to succeed **John N. Beckley,** deceased and **Charles E. Merrill,** of Merrill, Lynch & Company, has resigned as a director.

George W. Neale has been appointed district representative of the **Northern Equipment Company,** Erie, Pa., for the State of Florida, with the exception of Jefferson county and the counties west thereof, with office at 504 East Fafayette street, Tampa, Fla.

Charles Francis Adams, Secretary of the Navy in President Hoover's cabinet, was elected a director of the **General Electric Company** at the annual meeting of the stockholders, at Schenectady, N. Y., on April 18. The other directors were re-elected.

Permanent Concrete Products, Inc., manufacturers of armored concrete crossing slabs, cribbing and other precast reinforced concrete products, Columbus, Ohio, has taken over the sale of these products which had previously been handled by the **Prendergast Company,** Marion, Ohio. **James R. Smith,** formerly associated with the Prendergast Company in the sale of these products, has become associated with Permanent Concrete Products, Inc., as vice-president in charge of sales, with headquarters at Columbus.

Mark R. Woodward, for the last 15 years assistant chief engineer of the Lehigh Portland Cement Company, at Allentown, Pa., has joined the cement equipment division of the **Babcock & Wilcox Company,** New York. Mr. Woodward is located in the Chicago office of the company, at 20 North Wacker Drive.

F. W. Magin, formerly executive vice-president in charge of the industrial controller division at Milwaukee, Wis., was elected president of the **Square D Company,** with headquarters at Detroit, Mich., at a meeting of the board of directors held March 15. **T. J. Kauffman** was elected chairman of the board. **H. S. Morgan** was elected secretary-treasurer. Mr. Morgan was formerly a member of the board of directors and retains his position on the board. **J. H. Pengilly** of Los Angeles, **L. W. Mercer, Vernon Brown** and **Carlton M. Higbie** were elected vice-presidents.

Herbert K. Williams has been appointed assistant to president of the **Safety Car Heating & Lighting Company,** with office at New York. Mr. Williams was born in Orange, N. J., in 1888. Immediately following his graduation from the Orange High School in 1905, he entered the employ of the Safety Car Heating & Lighting Company as a clerk in the office of the mechanical engineer. After six years of service in the engineering and executive departments of the company and at the time the axle lighting system for railway passenger equipment cars was just coming into prominence, Mr. Williams was transferred to the factory where he spent a large part of his time in the laboratory in a general study of the theory and design of axle lighting equipment. In 1916 he was assigned to the New York sales district as representative. In 1918 the export business of the company was consolidated in a department over which Mr. Williams was placed in charge, although at the same time he continued his connection with the New York sales district. In 1926 Mr. Williams was appointed sales engineer. In 1928 he was made manager of the equipment department in charge of sales, which position he held up to the time of his present appointment.

Herbert K. Williams

R. E. Hellmund, who has been appointed chief engineer of the **Westinghouse Electric & Manufacturing Company,** East Pittsburgh, Pa., is the first

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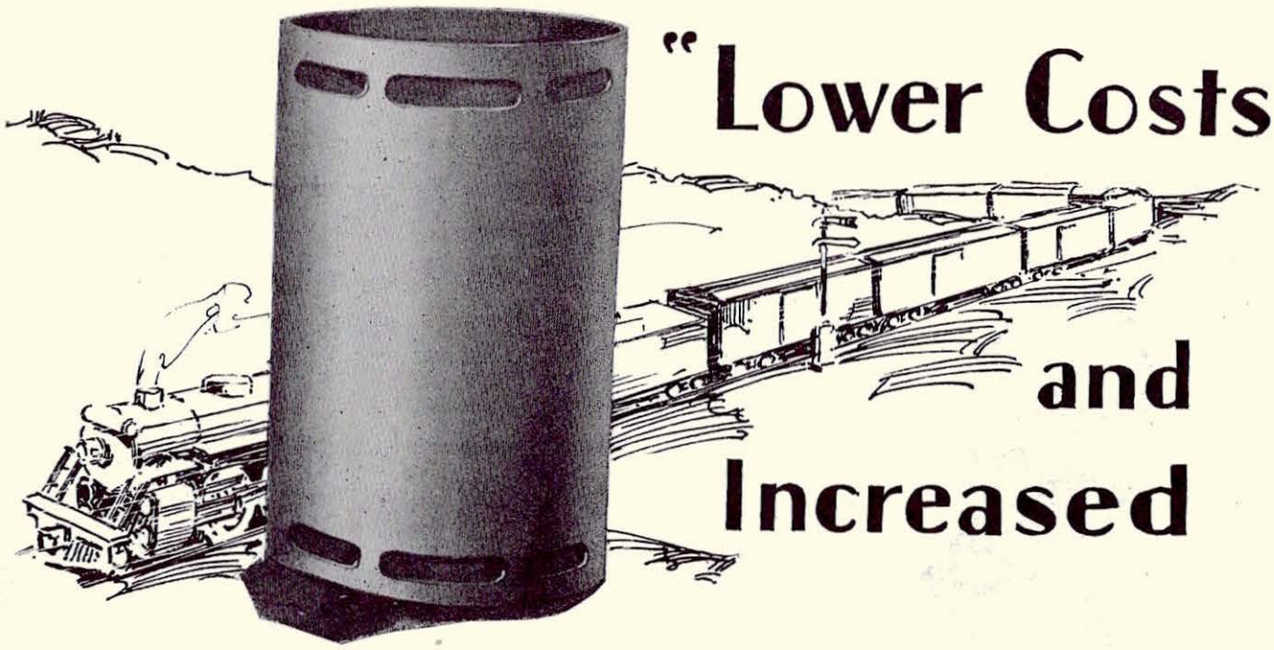

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HUNT-SPILLER *Air Furnace* GUN IRON

Westinghouse executive to hold this office since the death of B. G. Lamme in 1924. Born in Gotha, Germany, Mr. Hellmund was graduated from Ilmenan University, following which he worked three years, and then continued his studies in Charlottenburg University. He was graduated from that school in 1899 with the degree of electrical engineer. After graduation he began his career as a designer of electrical machinery in a large manufacturing concern in Germany, and later performed

R. E. Hellmund

laboratory work and designed switchboards for other concerns. In 1904 he came to the United States and was associated with William Stanley at Great Barrington, Mass., on the development of self-compounding alternators. Later he designed induction motors for the Western Electric Company. In 1907 he joined the Westinghouse Electric & Manufacturing Company, first engaging in work of the general engineering department and later being placed in charge of all design of direct current and alternating current railway motors. In 1917, Westinghouse officials gave him miscellaneous consulting duties in which he continued until 1921 when he was appointed engineer supervisor of development. In 1926 he became chief electrical engineer, which position he has held until his present appointment.

H. W. Cope, assistant director of engineering of the **Westinghouse Electric & Manufacturing Company,** East Pittsburgh, Pa., has been appointed assistant to the vice-president, in which position he will direct the co-ordination of certain headquarters engineering departments and district office engineers. Mr. Cope was born at North Vernon, Ind., and was graduated from Franklin College and Purdue University. Immediately after receiving his degree in electrical engineering, in 1898, he entered the Westinghouse organization. After serving in the testing department, he worked in the engineering division and later was appointed manager of the alternating current department. In 1909 he was appointed assistant to the manager of the industrial department and in 1914 became director of exhibits for the Westinghouse Company at the Panama-Pacific International Exposition, San Francisco, Cal. Mr. Cope returned to East Pittsburgh, in 1916 as assistant to the manager of engineering and since 1920 served as assistant director of engineering.

OBITUARY

John Newton Beckley, chairman of the board and executive committee of the General Railway Signal Company and president of the Toronto, Hamilton & Buffalo, who died on April 19 at his home in Rochester, N. Y., after a week's illness of pneumonia, was born on December 30, 1848, at Clarendon, N. Y. He received his education at Brockport Collegiate Institute and at Genesee Wesleyan Seminary. After being graduated from the latter he spent two years at Genesee College, now Syracuse University. Upon leaving college he taught school in Minnesota, and then began his career as a lawyer at Batavia, N. Y., being admitted to practice in June 1875. From 1880 to 1886 he served as corporation counsel of the City of Rochester, and then as a member of the law firm of Bacon, Briggs, Beckley & Bissell. In 1890 he became president of the Rochester Railway Company, which he reorganized and continued as president of the company until 1900. He organized a construction company to build the Toronto,

John Newton Beckley

Hamilton & Buffalo and was president of the company until his death. His first important position in the signaling field was as chief executive of the Pneumatic Signal Company which built a plant at Rochester, N. Y., and absorbed the Standard Signal Company formerly at Rahway, N. J., and then at Troy, N. Y. In 1904 the Pneumatic Signal Company, Rochester, N. Y., and the Taylor Signal Company of Buffalo, were consolidated in the General Railway Signal Company, of which Mr. Beckley became chairman of the board and the executive committee, which position he held until his death.

Financial

ATCHISON, TOPEKA & SANTA FE.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon a line from McConnico, Ariz., to Chloride, 23.41 miles.

BALTIMORE & OHIO.—*Preliminary Report.*—The preliminary report of this company for 1932 shows net deficit after interest and other charges of $6,334,978, as compared with net income of $3,427,662 in 1931. Selected items from the Income Statement follow:

	1932	1931	Increase or Decrease
Railway Operating Revenues	$125,882,823	$172,753,429	-$46,870,606
Maintenance of way	10,317,522	15,266,061	-4,948,539
Maintenance of equipment	22,157,472	35,522,657	-13,365,185
Transportation	46,343,123	64,927,748	-18,584,625
Total Operating Expenses	91,654,935	132,104,525	-40,449,590
Operating ratio	72.81	76.47	-3.66
Net Revenue from Operations	34,227,888	40,648,904	-6,421,016
Taxes	8,905,018	9,255,700	-350,682
Equipment, joint facility rents, etc.	3,349,472	3,640,806	-291,334
Net Railway Operating Income	21,973,398	27,752,398	-5,779,000
Other income	6,578,829	9,489,699	-2,910,870
Gross Income	28,552,227	37,242,097	-8,689,870
Total Deductions from Gross Income	34,887,205	33,814,435	+1,072,770
Net Income	*6,334,978	3,427,662	-9,762,640

* Deficit.

CENTRAL OF GEORGIA.—*Annual Report.*—The 1932 annual report of this company shows net deficit after interest and other charges of $3,341,676, as compared with net deficit of $591,737 in 1931. Selected items from the Income Statement follow:

	1932	1931	Increase or Decrease
Average Mileage Operated	1,944.65	1,944.40	+.25
RAILWAY OPERATING REVENUES	$11,547,648	$17,076,488	-$5,528,839
Maintenance of way	1,427,497	1,758,313	-330,817
Maintenance of equipment	2,290,480	3,015,092	-724,612
Transportation	5,156,746	7,378,760	-2,222,013
TOTAL OPERATING EXPENSES	10,422,516	13,981,681	-3,559,164
Operating ratio	90.26	81.88	+8.38
NET REVENUE FROM OPERATIONS	1,125,132	3,094,807	-1,969,675
Railway tax accruals	1,152,238	1,342,074	-189,836
Railway operating income	*32,597	1,745,957	-1,778,553
Joint facility rents	142,443	149,419	-6,976
NET RAILWAY OPERATING INCOME	*271,874	1,581,563	-1,853,437
Non-operating income	626,673	1,424,227	-797,554
GROSS INCOME	354,799	3,005,790	-2,650,991
Rent for leased roads	343,597	343,603	-6
Interest on funded debt	3,004,679	2,938,256	+66,423
TOTAL DEDUCTIONS FROM GROSS INCOME	3,696,475	3,597,527	+98,948
NET DEFICIT	3,341,676	591,737	+2,749,939

* Deficit.

BOSTON & MAINE.—*New Directors.*—At a meeting of the board of directors of this company held on April 25, Roger Amory, trustee of the Weld and other

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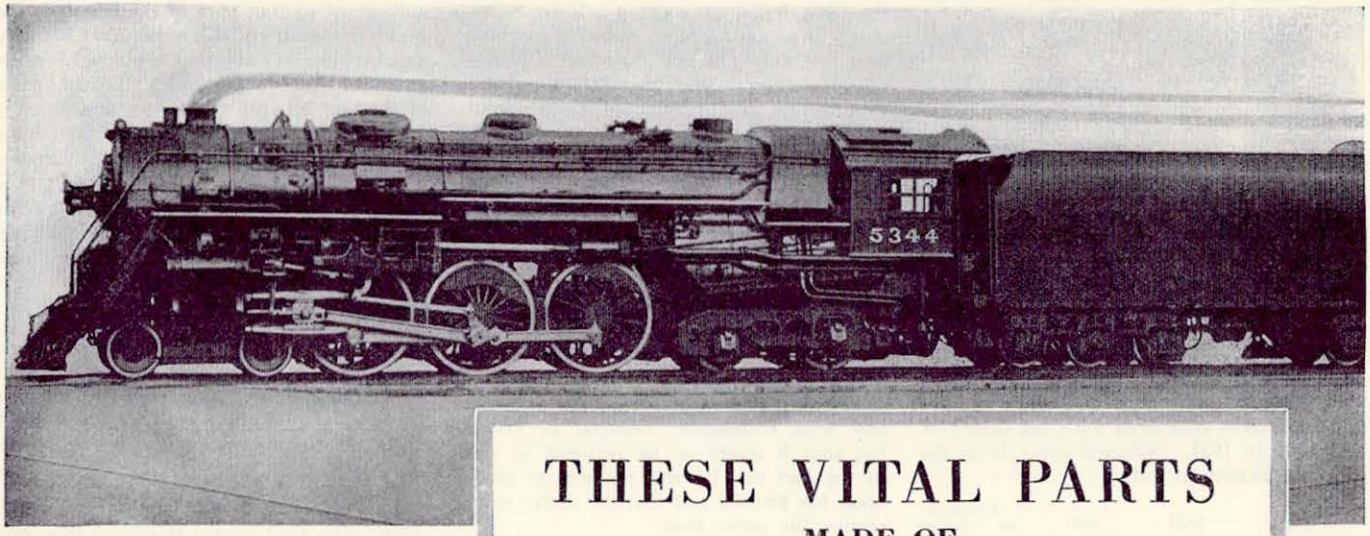
5 TIMES AROUND THE WORLD

No major repairs...no replacements



● *The locomotive pictured above was built in 1931 at Schenectady for a leading Eastern railroad by the American Locomotive Company.*

ONE HUNDRED and twenty thousand miles...almost 5 times around the world...120 runs between Chicago and New York!

Mile upon mile of continuous pounding. Mile upon mile of sway and stress. Mile upon mile where metal is required to resist fatigue, shock and high temperatures.

Then the railroad gave this locomotive a 100% inspection. Found all parts in excellent condition. Found no major repairs needed, no replacements required. A tribute to the builder, the American Locomotive Company, and to the producers of the materials used.

Many of the vital parts of this locomotive were rolled or forged from Nickel Alloy Steels. The American Locomotive Company, as well as other well-known locomotive builders, use Nickel Alloy Steels to obtain greater strength with toughness, and resistance to shock and fatigue. We have compiled data on the uses of Nickel Alloy Steels in railway operations. We would like to send you the latest and most authoritative information. Also, our engineers are always glad to advise you in the selection of the proper Nickel Alloy Steels to meet your requirements.

THESE VITAL PARTS MADE OF NICKEL ALLOY STEELS:

Boiler Shell — Made from low carbon Nickel Steel plates, thereby increasing the strength without increase in weight. This steel is also resistant to aging embrittlement at boiler operating temperatures.

Firebox Staybolts — Made from "Agathon nickel iron" (Republic Steel Corp.), containing 2% nickel and under .10% carbon. This material, case-hardened, provides a wear resistant surface with an extremely tough, shock-resisting core.

Timken Roller Bearings—Rollers and races of Nickel Alloy Steels for strength with toughness, and resistance to wear and shock.

Superheater Parts—Pipe washers and unit clamp bolts made of Nickel-chromium steel, giving greater stability under high pressures and temperatures, and also increased strength.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

Miners, refiners and rollers of Nickel. Sole producers of Monel Metal.

estates of Boston and Westwood, Mass., and James Garfield, lawyer of Boston and Cambridge, were elected directors succeeding Walter C. Baylies of Taunton and Roger Pierce of Milton, resigned.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—*Annual Report.*—The 1932 annual report of this company shows net deficit after interest and other charges of $23,269,678, an increase of $9,456,919 over the 1931 figure. Selected items from the Income Statement follow:

	1932	Increase or Decrease
Railway Operating Revenues	$84,900,833	−$26,522,939
Maintenance of way	13,446,229	−3,594,922
Maintenance of equipment	18,683,044	−3,072,032
Transportation	33,545,311	−9,620,589
Total Operating Expenses	72,078,118	−17,191,327
Operating ratio	84.90	+3.78
Net Revenue from Operations	12,822,714	−9,331,611
Railway tax accruals	7,921,000	−802,000
Railway operating income	4,866,813	−8,544,191
Equipment rents—Dr.	2,767,639	+301,453
Joint facility rents—Dr.	2,617,291	+6,879
*Net Railway Operating Income**	518,116	−8,852,522
Non-operating income	1,519,130	−565,896
Gross Income	1,001,014	−9,418,419
Rent for leased roads	1,113,979	+6,466
Total Deductions from Gross Income	1,288,956	+60,040
Net Deficit	23,269,678	+9,456,919

* Deficit.

CHICAGO, ROCK ISLAND & PACIFIC.—*Annual Report.*—The 1932 annual report of this company and its subsidiary lines shows net deficit after interest and other charges of $9,956,801, compared with net deficit of $386,545 in 1931. Selected items from the Income Statement follow:

	1932	1931	Increase or Decrease
Average Mileage Operated	8,340.38	8,282.50	+57.86
RAILWAY OPERATING REVENUES	$70,780,027	$99,069,563	−$28,289,537
Maintenance of way	6,730,416	10,987,985	−4,257,569
Maintenance of equipment	13,821,332	17,717,462	−3,896,130
Transportat'n	28,802,295	37,553,757	−8,751,462
TOTAL OPERATING EXPENSES	56,341,423	74,526,868	−18,185,445
Operating ratio	79.60	75.23	+4.37
NET REVENUE FROM OPERATIONS	14,438,604	24,542,695	−10,104,091
Railway tax accruals	5,890,000	6,530,000	−640,000
Railway operating income	8,525,472	17,988,880	−9,463,408
Equipment rents, Dr.	3,303,035	3,871,993	−568,958
Joint facility rents, Dr.	1,174,208	1,192,881	−18,673
NET RAILWAY OPERATING INCOME	4,048,229	12,924,007	−8,875,777
Non-operating income	507,769	1,068,318	−560,548
GROSS INCOME	4,555,999	13,992,325	−9,436,326
Rent for leased roads	155,286	155,289	−3
NET DEFICIT	9,956,801	386,545	+9,570,256

CHICAGO, INDIANAPOLIS & LOUISVILLE.—*Notes.*—The Interstate Commerce Commission has authorized this company to issue $233,000 of promissory notes to procure part of the funds necessary to pay maturing interest. The company has been authorized to procure the authentication and delivery of $177,000 of its first and general mortgage series B bonds to be pledged as collateral security for short term notes.

EUREKA-NEVADA.—*R. F. C. Loan Denied.*—Division 4 of the Interstate Commerce Commission has denied approval of this company's application for a loan of $10,000 from the Reconstruction Finance Corporation. On July 1, 1932, it had approved a loan of $6,000 for rehabilitation purposes but because of the delay other funds were used for that purpose and the loan was not made. Upon the supplemental application the division was unable to find that the loan would be adequately secured.

FONDA, JOHNSTOWN & GLOVERSVILLE.—*Reorganization.*—This company has filed in the federal district court a petition stating that it is unable to meet maturing indebtedness and that it desires to effect a plan of reorganization. The Interstate Commerce Commission has forwarded to the court the following additions to its panel of standing trustees: J. Ledlie Hees, of Gloversville, N. Y., president of the company; Paul S. Andrews, of Syracuse, N. Y.; and Charles G. Blakeslee, of Binghamton, N. Y., and D. M. Cosgrove, of Watertown, N. Y. The court appointed Mr Hees trustee and he has addressed a letter to the commission asking that the salary be fixed at least $15,000 a year, stating that for several years prior to 1931 his salary as president was $15,000 and that it has been voluntarily reduced to $10,800 but that it ought to be restored in view of the fact that he was required to give a bond for $50,000 and that the duties would require his entire time.

GRAND TRUNK WESTERN.—*Abandonment of Operation.*—The Interstate Commerce Commission has authorized this company to abandon operation under trackage rights over the Ann Arbor between Owosso Junction, Mich., and Ashley, 20.5 miles.

GREAT NORTHERN.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority for the authentication and delivery of $48,000,000 of general mortgage 6 per cent gold bonds to be used in part as collateral for a loan from the Reconstruction Finance Corporation to meet cash requirements to July 1. The remainder is to be held in the treasury for later use as collateral for other loans.

GREAT NORTHERN.—*R. F. C. Loan.*—This company has applied to the Reconstruction Finance Corporation for a loan of $6,000,000 to assist it in meeting bond interest amounting to $8,824,428 due June 30. The application stated that the company had expected to obtain the amount from bank loans but that recent developments in the banking situation had made it impossible.

GULF & SHIP ISLAND.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its branch line from Columbia, Miss., to Maxie, 48 miles.

ILLINOIS CENTRAL—*New Director*—R. E. Connolly, treasurer of the Illinois Central, with headquarters at New York, has been elected a director of the company for one year to fill out the unexpired term of Robert S. Lovett, deceased.

JEFFERSON & NORTHWESTERN.—*Abandonment.*—This company, which last year applied unsuccessfully for a loan of $40,000 from the Reconstruction Finance Corporation, has applied to the Interstate Commerce Commission for authority to abandon its line from Lindon Junction, Tex., to Naples, 29 miles.

LA CROSSE & SOUTHEASTERN.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon operation of its entire line of railroad extending from La Crosse, Wis., to Viroqua, 42.6 miles, including 1.8 miles of trackage rights over the Chicago, Burlington & Quincy. Outright abandonment is authorized of that part of the line between South Junction and Chaseburg, 16.8 miles, and between Westby and a point 1.7 miles north of Viroqua, 6 miles. Those parts of the line between Chaseburg and Westby and between a point 1.7 miles north of Viroqua and the end of the line at Viroqua, a total of 18.2 miles, have been sold to the Chicago, Milwaukee, St. Paul & Pacific which will operate them. The abandoned segments of line are paralleled by other railways so no communities will lose service by the action.

LOUISIANA SOUTHERN.—*R. F. C. Loan.*—Division 4 of the Interstate Commerce Commission has denied approval of this company's application for a loan of $40,000 from the Reconstruction Finance Corporation.

LOUISVILLE & NASHVILLE.—*Annual Report.*—The 1932 annual report of this company shows net deficit after interest and other charges of $2,108,875 as compared with net income of $1,039,946 in 1931. Selected items from the Income Statement follow:

	1932	1931	Increase or Decrease
RAILWAY OPERATING REVENUES	$63,920,024	$87,019,791	−$23,099,767
TOTAL OPERATING EXPENSES	51,614,492	72,384,608	−20,770,116
Operating ratio	80.75	83.18	−2.43
NET REVENUE FROM OPERATIONS	12,305,532	14,635,183	−2,329,651
Railway tax accruals	4,508,867	5,485,518	−976,651
Railway operating income	7,775,484	9,129,066	−1,353,582
Equipment rents, net Cr.	1,129,989	1,052,536	+77,453
Joint facility rents, net Dr.	627,383	662,278	−34,895
NET RAILWAY OPERATING INCOME	8,278,090	9,519,324	−1,241,234
Non-operating income	2,984,176	4,020,071	−1,035,895
GROSS INCOME	10,759,661	13,149,137	−2,389,476
Rent for leased roads	296,223	308,432	−12,209
Interest on funded debt	10,355,864	10,428,303	−72,439
TOTAL DEDUCTIONS FROM GROSS INCOME	12,868,536	12,109,191	+759,345
NET INCOME	*2,108,875	1,039,946	−3,148,821

* Deficit

(*Continued on page 653*)

Annual Reports

Union Pacific Railroad Company

Thirty-Sixth Annual Report—Year Ended December 31, 1932

TO THE STOCKHOLDERS OF UNION PACIFIC RAILROAD COMPANY:

The Board of Directors submits the following report of the operations and affairs of the Union Pacific Railroad Company for the calendar year ended December 31, 1932, *including* the Oregon Short Line Railroad Company, whose entire capital stock is owned by the Union Pacific Railroad Company, the Oregon-Washington Railroad & Navigation Company, whose entire capital stock (except fifteen qualifying shares held by Directors) is owned by the Oregon Short Line Railroad Company, and the Los Angeles & Salt Lake Railroad Company, whose entire capital stock is owned, one half each, by the Union Pacific Railroad Company and the Oregon Short Line Railroad Company. For convenience, the four companies are designated by the term "UNION PACIFIC SYSTEM."

INCOME

The operated mileage at close of year and income for the calendar year 1932, compared with 1931, *after excluding all offsetting accounts between the Union Pacific Railroad Co., Oregon Short Line Railroad Co., Oregon-Washington Railroad & Navigation Co., and Los Angeles & Salt Lake Railroad Co.*, were as follows:

	Calendar Year 1932	Calendar Year 1931	INCREASE	DECREASE
Operated Mileage at Close of Year				
Miles of road	9,817.48	9,841.09	.....	23.61
Miles of additional main track	1,542.32	1,562.95	.....	20.63
Miles of yard tracks and sidings	4,181.82	4,159.55	22.27	.....
Total Mileage Operated	15,541.62	15,563.59	.....	21.97
Transportation Operations				
Operating revenues	$114,812,397.13	$154,568,410.60	.....	$39,756,013.47
Operating expenses	78,983,117.63	109,951,393.82	.....	30,968,276.19
Revenues over expenses	$35,829,279.50	$44,617,016.78	.....	$8,787,737.28
Taxes	10,591,036.98	12,181,907.71	.....	1,590,870.73
Uncollectible railway revenues	13,746.64	14,073.14	.....	326.50
Railway Operating Income	$25,224,495.88	$32,421,035.93	.....	$7,196,540.05
Rents from use of joint tracks, yards, and terminal facilities	1,645,616.89	1,692,860.26	.....	47,243.37
	$26,870,112.77	$34,113,896.19	.....	$7,243,783.42
Hire of equipment—debit balance	$6,657,309.60	$7,285,718.10	.....	$628,408.50
Rents for use of joint tracks, yards, and terminal facilities	2,200,266.19	2,125,746.91	$74,519.28	.....
	$8,857,575.79	$9,411,465.01	.....	$553,889.22
Net Income from Transportation Operations	**$18,012,536.98**	**$24,702,431.18**	.....	**$6,689,894.20**
Income from Investments and Sources Other than Transportation Operations				
Dividends on stocks owned	$11,960,556.59	$10,823,023.20	$1,137,533.39	.....
Interest on bonds, notes, and equipment trust certificates owned	5,538,529.71	5,837,941.45	.....	$299,411.74
Interest on loans and open accounts—balance	221,367.01	175,666.72	45,700.29	.....
Rents from lease of road	120,306.25	120,035.92	270.33	.....
Miscellaneous rents	553,611.68	580,766.83	.....	27,155.15
Miscellaneous income	41,367.97	134,598.51	.....	93,230.54
Total	$18,435,739.21	$17,672,032.63	$763,706.58	.....
Total Income	$36,448,276.19	$42,374,463.81	.....	$5,926,187.62
Fixed and Other Charges				
Interest on funded debt	$15,012,021.43	$15,136,201.82	.....	$124,180.39
Miscellaneous rents	11,920.48	14,674.59	.....	2,754.11
Miscellaneous charges	789,445.80	1,166,275.32	.....	376,829.52
Total	$15,813,387.71	$16,317,151.73	.....	$503,764.02
Net Income from All Sources	**$20,634,888.48**	**$26,057,312.08**	.....	**$5,422,423.60**
DISPOSITION OF NET INCOME				
Dividends on Stock of Union Pacific Railroad Company:				
Preferred stock:				
2 per cent paid April 1, 1932 $1,990,862.00				
2 per cent paid October 1, 1932 1,990,862.00				
	$3,981,724.00	$3,981,724.00	.....	.....
Common stock:				
2½ per cent paid April 1, 1932 $5,557,275.00				
1½ per cent paid July 1, 1932 3,334,365.00				
1½ per cent paid October 1, 1932 3,334,365.00				
1½ per cent payable January 3, 1933 3,334,365.00				
	15,560,370.00	22,229,100.00	.....	$6,668,730.00
Total Dividends	$19,542,094.00	$26,210,824.00	.....	$6,668,730.00
Balance, Transferred to Profit and Loss	**$1,092,794.48**	*$153,511.92	**$1,246,306.40**	.....

* Debit.

The increase in dividends on stocks owned of $1,137,533.39 was due principally to increase of $4,747,423.14 in dividends on stock of the Pacific Fruit Express Company, partially offset by decrease of $3,609,889.75 in dividends on stocks of companies other than affiliated companies. The increased dividend from the Pacific Fruit Express Company was substantially all paid out of surplus resulting from earnings of that company for prior years, and this payment reduced the amount of that company's deposit with the Union Pacific and accounts for decrease in the item "Nonnegotiable Debt to Affiliated Companies" in the general balance sheet.

The decrease in miscellaneous charges was chiefly in connection

[Advertisement]

General Balance Sheet—Assets

(Excluding all offsetting securities and accounts between the Union Pacific Railroad Co., Oregon Short Line Railroad Co., Oregon-Washington Railroad & Navigation Co., and Los Angeles & Salt Lake Railroad Co.)

	December 31, 1932	December 31, 1931	Increase	Decrease
Investments:				
Road and Equipment	$924,863,535.33	$925,569,583.78	.....	$706,048.45
Less:				
Receipts from improvement and equipment fund	$23,823,091.13	$23,823,091.13	.....	.....
Appropriations from income and surplus prior to July 1, 1907, credited to this account	13,310,236.52	13,310,236.52	.....	.....
Total	$37,133,327.65	$37,133,327.65	.....	.....
701. **Investment in road and equipment**	**$887,730,207.68**	**$888,436,256.13**	.....	**$706,048.45**
704. Deposits in lieu of mortgaged property sold	$465,514.80	$455,710.62	$9,804.18	.....
705. Miscellaneous physical property	2,547,624.66	2,348,282.11	199,342.55	.....
Total	$3,013,139.46	$2,803,992.73	$209,146.73	.....
706. **Investments in affiliated companies:**				
Stocks	$22,522,147.03	$22,611,361.53	.....	$89,214.50
Bonds, notes, and equipment trust certificates	17,914,593.79	19,388,316.94	.....	1,473,723.15
Advances	22,116,923.15	19,079,087.60	$3,037,835.55	.....
Total	$62,553,663.97	$61,078,766.07	$1,474,897.90	.....
707. **Investments in other companies:**				
Stocks	$84,688,169.36	$90,843,611.73	.....	$6,155,442.37
Bonds, notes, and equipment trust certificates	75,534,487.13	78,471,139.11	.....	2,936,651.98
Total	$160,222,656.49	$169,314,750.84	.....	$9,092,094.35
United States Government Bonds and Notes	$23,982,664.88	$26,982,664.88	.....	$3,000,000.00
703. Sinking funds	$189,921.91	$181,618.00	$8,303.91	.....
Total Investments	**$1,137,692,254.39**	**$1,148,798,048.65**	.....	**$11,105,794.26**
Current Assets:				
708. Cash	$20,744,968.32	$12,181,489.32	$8,563,479.00	.....
709. Demand loans and deposits	.....	4,750,000.00	.....	$4,750,000.00
710. Time drafts and deposits	65,404.54	.....	65,404.54	.....
711. Special deposits	63,125.13	57,739.23	5,385.90	.....
712. Loans and bills receivable	18,249.40	14,314.17	3,935.23	.....
713. Traffic and car service balances receivable	2,467,060.89	2,998,070.98	.....	531,010.09
714. Net balance receivable from agents and conductors	747,818.71	832,426.23	.....	84,607.52
715. Miscellaneous accounts receivable	3,407,570.40	3,947,673.53	.....	540,103.13
716. Material and supplies	13,734,688.32	15,849,039.11	.....	2,114,350.79
717. Interest and dividends receivable	1,493,300.31	1,583,609.15	.....	90,308.84
718. Rents receivable	165,923.48	178,237.12	.....	12,313.64
719. Other current assets:				
Baltimore and Ohio Railroad Co. capital stock applicable to payment of extra dividend of 1914	118,930.20	119,642.20	.....	712.00
Miscellaneous items	8,273.14	13,841.54	.....	5,568.40
Total Current Assets	$43,035,312.84	$42,526,082.58	$509,230.26	.....
Deferred Assets:				
720. Working fund advances	$60,676.01	$72,142.95	.....	$11,466.94
722. Other deferred assets:				
Land contracts, as *per contra*	2,97900.	2,343.24	$635.76	.....
Miscellaneous items	2,632,800.85	2,521,070.59	111,730.26	.....
Total Deferred Assets	$2,696,455.86	$2,595,556.78	$100,899.08	.....
Unadjusted Debits:				
723. Rents and insurance premiums paid in advance	$2,877.92	$4,333.79	.....	$1,455.87
725. Discount on funded debt	890,074.76	921,768.80	.....	31,694.04
727. Other unadjusted debits	1,695,352.29	1,842,514.88	.....	147,162.59
Total Unadjusted Debits	$2,588,304.97	$2,768,617.47	.....	$180,312.50
Grand Total	**$1,186,012,328.06**	**$1,196,688,305.48**	.....	**$10,675,977.42**

with operation of highway motor coach service by affiliated companies.

The decrease of $39,756,013.47 or 25.7% in "Operating Revenues" was due to a decrease in all traffic attributable to the further decline in business activities of all kinds.

There was a decrease of 24.4 per cent in net ton-miles of commercial freight carried, but the average revenue per ton-mile was approximately the same as last year. The percentage decrease in tonnage of carload freight handled in each general commodity group was:

Products of agriculture	20.07
Animals and products	12.06
Products of mines	23.35
Products of forests	47.37
Manufactures and miscellaneous	26.96

Tonnage of less than carload freight handled decreased 35.57 per cent.

There was a decrease of 29.7 per cent in revenue passengers carried one mile, and of 8.1 per cent in average revenue per passenger mile, the latter resulting from reduced excursion and party rates made to encourage passenger travel.

The increase of $262,852.98 or 65.2% in "Other Train Revenue" was due to the combination rail-truck service under contract with Union Pacific Stages, Inc. (referred to in last year's report) being in operation for the full year 1932 but only for a part of the previous year.

The decrease of $30,968,276.19 or 28.2% in "Operating Expenses" was due principally to a decrease of 11.1 per cent in freight-train miles by reason of the smaller volume of freight traffic, and to decreases of 17.6 per cent and 10.1 per cent, respectively, in passenger-train and rail motor-car miles effected by consolidating several main line through passenger trains between certain intermediate points and by discontinuing many other passenger trains and rail motor cars which could not be operated profitably, with a consequent reduction in transportation expenses, the lesser use of roadway and track and of equipment occasioned by the decreases in train mileage making possible

[Advertisement]

General Balance Sheet—Liabilities

(Excluding all offsetting securities and accounts between the Union Pacific Railroad Co., Oregon Short Line Railroad Co., Oregon-Washington Railroad & Navigation Co., and Los Angeles & Salt Lake Railroad Co.)

	December 31, 1932	December 31, 1931	Increase	Decrease
751. **Capital Stock:**				
Common stock	$222,292,500.00	$222,292,500.00	.....	.....
Preferred stock	99,543,100.00	99,543,100.00	.....	.....
Total Capital Stock	$321,835,600.00	$321,835,600.00	.....	.....
755. **Funded Debt**	355,421,710.00	357,659,725.00	.....	$2,238,015.00
Total	$677,257,310.00	$679,495,325.00	.....	$2,238,015.00
754. **Grants in Aid of Construction**	$1,257,596.11	$939,357.39	†$318,238.72	.....
757. **Non-negotiable Debt to Affiliated Companies**	$18,473,731.94	*$22,738,011.17	.....	$4,264,279.23
Current Liabilities:				
759. Traffic and car service balances payable	$1,238,199.75	$1,508,369.33	.....	$270,169.58
760. Audited accounts and wages payable	5,188,517.66	6,606,119.72	.....	1,417,602.06
761. Miscellaneous accounts payable	156,748.98	133,774.35	$22,974.63	.....
762. Interest matured unpaid:				
Coupons matured, but not presented	102,755.29	92,548.54	10,206.75	.....
Coupons and interest on registered bonds, due first proximo	4,516,715.40	4,516,702.50	12.90	.....
763. Dividends matured unpaid:				
Dividends due but uncalled for	129,803.50	135,566.00	.....	5,762.50
Extra dividend on common stock declared January 8, 1914, payable to stockholders of record March 2, 1914, unpaid	128,111.81	128,838.92	.....	727.11
Dividend on common stock payable third proximo	3,334,365.00	5,557,275.00	.....	2,222,910.00
764. Funded debt matured unpaid	24,300.00	25,325.00	.....	1,025.00
766. Unmatured interest accrued	1,478,982.69	1,503,380.41	.....	24,397.72
767. Unmatured rents accrued	597,264.56	606,450.52	.....	9,185.96
768. Other current liabilities	80,752.27	81,597.17	.....	844.90
Total Current Liabilities	$16,976,516.91	$20,895,947.46	.....	$3,919,430.55
Deferred Liabilities:				
770. Other deferred liabilities:				
Principal of deferred payments on land contracts, as *per contra*	$2,979.00	$2,343.24	$635.76	.....
Contracts for purchase of real estate	1,660,000.00	1,660,000.00	.....	.....
Miscellaneous items	7,815,330.01	7,942,725.36	.....	$127,395.35
771. Tax liability	5,308,520.65	6,392,478.36	.....	1,083,957.71
Total Deferred Liabilities	$14,786,829.66	$15,997,546.96	.....	$1,210,717.30
Unadjusted Credits:				
773. Insurance reserve:				
Reserve for fire insurance	$5,373,361.27	$4,847,793.78	$525,567.49	.....
776. Reserve for depreciation	91,790,058.63	85,479,968.95	6,310,089.68	.....
778. Other unadjusted credits:				
Contingent interest	1,331,095.61	828,033.09	503,062.52	.....
Miscellaneous items	1,316,567.31	1,512,860.94	.....	$196,293.63
Total Unadjusted Credits	$99,811,082.82	$92,668,656.76	$7,142,426.06	.....
Total Liabilities	**$828,563,067.44**	**$832,734,844.74**	.....	**$4,171,777.30**
Surplus:				
Appropriated for additions and betterments	$30,569,006.99	$30,544,279.78	†$24,727.21	.....
Reserved for depreciation of securities	34,972,570.88	34,972,570.88	.....	.....
Funded debt retired through income and surplus	536,828.66	536,828.66	.....	.....
Sinking fund reserves	193,849.27	185,542.67	8,306.60	.....
Total Appropriated Surplus	$66,272,255.80	$66,239,221.99	$33,033.81	.....
784. **Profit and Loss—Credit Balance**	**259,504,110.60**	**266,041,344.53**	.....	**$6,537,233.93**
Total Surplus	$325,776,366.40	$332,280,566.52	.....	$6,504,200.12
As this consolidated balance sheet excludes all intercompany items, securities of the Los Angeles & Salt Lake Railroad Company owned by other System companies are not included. The difference between the par and face value of such securities as carried on the books of the Los Angeles & Salt Lake (less unextinguished discount on the bonds and discount charged to Profit and Loss but added back in consolidating the accounts) and the amounts at which the securities are carried on the books of the owning System companies is set up here to balance	$31,672,894.22	$31,672,894.22	.....	.....
Grand Total	**$1,186,012,328.06**	**$1,196,688,305.48**	.....	**$10,675,977.42**

* This amount was stated as a current liability in last year's report but is now restated as above in accordance with a ruling of the Interstate Commerce Commission.

† These amounts respectively represent donations made during the year by Federal Government, States, counties and municipalities and by individuals and companies in part payment for improvements, such as road crossings, drainage projects, and industry spur tracks, the cost of which was charged to "Investment in Road and Equipment." These amounts are so accounted for to conform with regulations of the Interstate Commerce Commission.

also a reduction in maintenance expenses. Other reasons for the decrease were: a reduction of 10 per cent in salaries and wages of all officers and employes, effective February 1, 1932; rearrangement of forces at various locations; curtailment of dining-car, hotel and restaurant operations because of the decline in passenger traffic; decreased expenditures for advertising, and a change, effective July 1, 1932, in the employes' group life insurance plan whereby premiums paid by the company were reduced. Way and structures and equipment were adequately maintained for the volume of traffic handled.

An analysis by classes of the decrease of $1,590,870.73 or 13.1% in "Taxes" is shown in the table. The decrease in State and county taxes resulted principally from decreases in several States in assessments and tax levies. The decrease in Federal income and other Federal taxes was due principally to a decrease in taxable income and to an adjustment in connection with accruals for prior years.

The decrease of $628,408.50 or 8.6% in "Equipment Rents (Debit)" was due chiefly to a decrease in mileage payments to private car lines, partially offset by a decrease in net receipts for per diem on railroad owned equipment, because of the decline in freight traffic.

The increase of $121,762.65 or 28.1% in "Joint Facility Rents (Debit)" was principally in rentals paid for use of terminal facilities at Portland, Oregon, which last year were less than normal because of adjustments.

[Advertisement]

Operating Results for Year 1932 Compared with Year 1931

	Calendar Year 1932	Calendar Year 1931	Increase	Decrease	Per Cent
Average miles of road operated	9,838.31	9,859.19	.....	20.88	.2
Operating Revenues					
1. Freight revenue	$93,640,661.79	$124,180,281.26	.....	$30,539,619.47	24.6
2. Passenger revenue	10,414,277.44	16,077,211.29	.....	5,662,933.85	35.2
3. Mail revenue	4,420,932.59	4,860,340.07	.....	439,407.48	9.0
4. Express revenue	1,793,445.67	2,692,748.75	.....	899,303.08	33.4
5. Other passenger-train revenue	1,289,017.41	2,514,779.91	.....	1,225,762.50	48.7
6. Other train revenue	665,753.65	402,900.67	$262,852.98	.....	65.2
7. Switching revenue	854,781.75	1,037,598.07	.....	182,816.32	17.6
8. Water line revenue	17,739.42	51,868.43	.....	34,129.01	65.8
9. Other revenue	1,715,787.41	2,750,682.15	.....	1,034,894.74	37.6
10. Total operating revenues	$114,812,397.13	$154,568,410.60	.....	$39,756,013.47	25.7
Operating Expenses					
11. Maintenance of way and structures	$10,240,310.76	$18,282,579.60	.....	$8,042,268.84	44.0
12. Maintenance of equipment	19,218,329.27	27,636,303.09	.....	8,417,973.82	30.5
13. Total maintenance expenses	$29,458,640.03	$45,918,882.69	.....	$16,460,242.66	35.8
14. Traffic expenses	3,265,033.80	4,261,215.58	.....	996,181.78	23.4
15. Transportation expenses—rail line	37,998,312.10	48,975,024.70	.....	10,976,712.60	22.4
16. Transportation expenses—water line	9,649.80	21,837.73	.....	12,187.93	55.8
17. Miscellaneous operations expenses	1,695,439.06	2,794,640.15	.....	1,099,201.09	39.3
18. General expenses	6,555,400.93	7,985,791.94	.....	1,430,391.01	17.9
19. Transportation for investment—*Credit*	*641.91*	5,998.97	.....	6,640.88	...
20. Total operating expenses	$78,983,117.63	$109,951,393.82	.....	$30,968,276.19	28.2
21. Revenue over expenses	$35,829,279.50	$44,617,016.78	.....	$8,787,737.28	19.7
Taxes					
22. State and county	$10,721,033.32	$11,438,704.09	.....	$717,670.77	6.3
23. Federal income and other federal	†129,996.34	743,203.62	.....	873,199.96	...
24. Total taxes	$10,591,036.98	$12,181,907.71	.....	$1,590,870.73	13.1
25. Uncollectible railway revenues	$13,746.64	$14,073.14	.....	$326.50	2.3
26. Railway operating income	$25,224,495.88	$32,421,035.93	.....	$7,196,540.05	22.2
27. Equipment rents (debit)	6,657,309.60	7,285,718.10	.....	628,408.50	8.6
28. Joint facility rents (debit)	554,649.30	432,886.65	$121,762.65	.....	28.1
29. Net railway operating income	$18,012,536.98	$24,702,431.18	.....	$6,689,894.20	27.1
Per cent—Operating expenses of operating revenues	68.79	71.13	.....	2.34	3.3
Freight Traffic (*Commercial Freight only*)					
Tons of revenue freight carried	19,498,647	25 751,542	.....	6,252,895	24.3
Ton-miles, revenue freight	7,982,255,542	10,562,219,853	.....	2,579,964,311	24.4
Average distance hauled per ton (*miles*)	409.37	410.16	.....	.79	.2
Average revenue per ton-mile (*cents*)	1.158	1.158	.....	.....	...
Average revenue per freight-train mile	$5.85	$6.87	.....	$1.02	14.8
Passenger Traffic (*Excluding Motor Car*)					
Revenue passengers carried	1,109,225	1,694,489	.....	585,264	34.5
Revenue passengers carried one mile	431,062,420	612,817,807	.....	181,755,387	29.7
Average distance hauled per passenger (*miles*)	388.62	361.65	26.97	.....	7.5
Average passengers per passenger-train mile	37.55	43.98	.....	6.43	14.6
Average revenue per passenger-mile (*cents*)	2.381	2.592	.....	.211	8.1
Average revenue per passenger-train mile, passengers only	$.89	$1.14	.....	$.25	21.9
Average total revenue per passenger-train mile	$1.44	$1.70	.....	$.26	15.3

Italics—Debit.
† Credit.

Expenditures chargeable to Investment in Road and Equipment were:

Additions and Betterments (*excluding equipment*)	$3,077,388.44	
Equipment	376,285.63	
Total		**$3,453,674.07**
Against which there was credited for retirements and adjustments (excluding transfers of property to wholly owned subsidiaries):		
Cost of property retired from service and not to be replaced	$1,512,743.28	
Cost of real estate retired	86,581.18	
Cost of equipment retired from service	676,858.29	
Adjustments—extensions and branches completed in previous years	45,413.73	
Total	2,321,596.48	
Net increase in "Investment in Road and Equipment" (excluding transfers of property to wholly owned subsidiaries)		**$1,132,077.59**
Credit to "Investment in Road and Equipment" for cost of property (principally industrial property) transferred to wholly owned subsidiaries and charged to their property investment accounts		1,838,126.04
Net decrease in "Investment in Road and Equipment"		***$706,048.45***

On authority of the Interstate Commerce Commission, the following branch line mileage was abandoned during the year, because of unprofitable operations:

	I. C. C. Finance Docket Number	Miles of Main Track	Miles of Yard Tracks and Sidings
Mendon to College Spur, Utah	9518	2.78	
Bell, Washington, to Amwaco, Idaho	9489	14.21	1.51
Beaver to Jefferson, Idaho	9490	8.31	.55
Wilson to Lucerne, Utah	9538	5.07	.87
Moody to Hinckley, Utah	9538	3.35	.31
Total		33.72	3.24

[Advertisement]

Southern Pacific Company

Report of the Board of Directors

NEW YORK, N. Y., April 19, 1933.

TO THE STOCKHOLDERS OF THE SOUTHERN PACIFIC COMPANY:

Your Board of Directors submits this report of the operations and financial affairs of the Southern Pacific Lines and Affiliated Companies for the year ended December 31, 1932.

Income Account

The following statements of income and of surplus show the net deficit for the year and the accumulated surplus to the close of the year, accruing to Southern Pacific Company stock from the Transportation System and from all *separately operated Solely Controlled Affiliated Companies,* combined:

NET DEFICIT OF THE SOUTHERN PACIFIC LINES AND SOLELY CONTROLLED AFFILIATED COMPANIES, COMBINED, FOR THE YEAR 1932, COMPARED WITH NET INCOME FOR THE YEAR 1931

	Year Ended December 31, 1932	Increased Deficit Compared with 1931 Amount	Per Cent
Net deficit of Transportation System.*	*$5,779,631.13*	$12,918,003.42	....
Net deficit of Affiliated Companies...*	*3,690,370.00*	433,331.38	13.30
Net deficit of Transportation System and of all separately operated Solely Controlled Affiliated Companies, combined..*	*$9,470,001.13*	$13,351,334.80	....

* The amounts reported exclude all inter-company dividends.

SURPLUS OF THE SOUTHERN PACIFIC LINES AND SOLELY CONTROLLED AFFILIATED COMPANIES, COMBINED, TO DECEMBER 31, 1932

	Debit	Credit
Total corporate surplus at December 31, 1931	.....	$535,017,653.39
Corporate surplus, at date of acquisition, of properties acquired during the year.....	.....	656,514.45
Net deficit during the year.....	$9,470,001.13	.....
Miscellaneous adjustments during the year	3,796,331.50	.....
Credit balance December 31, 1932.....	522,407,835.21	.....
	$535,674,167.84	$535,674,167.84

Income Account of Southern Pacific Lines

The income account of the Transportation System (Southern Pacific Company and Transportation System Companies, combined, excluding offsetting accounts and inter-company dividends) for the year 1932, compared with the year 1931, was as follows:

	Year Ended December 31, 1932	+Increase −Decrease	Per Cent
OPERATING INCOME			
Railway operating revenues.....	$142,597,140.10	−$56,045,035.36	28.21
Railway operating expenses.....	115,202,961.37	−36,505,587.45	24.06
Net revenue from railway operations	$27,394,178.73	−$19,539,447.91	41.63
Railway tax accruals.....	14,768,413.28	−2,288,421.63	13.42
Uncollectible railway revenues.....	55,959.04	−5,388.71	8.78
Equipment rents—Net	6,584,945.65	−823,836.67	11.12
Joint facility rents—Net.....	378,703.95	−63,502.84	14.36
Net railway operating income...	$5,606,156.81	−$16,358,298.06	74.48
Revenues from miscellaneous operations	$493,645.11	−$150,268.99	23.34
Expenses of miscellaneous operations	495,996.22	−125,042.05	20.13
Net deficit from miscellaneous operations	*$2,351.11*	+$25,226.94	....
Total operating income.....	$5,603,805.70	−$16,383,525.00	74.51
NONOPERATING INCOME			
Income from lease of road.....	$97,864.22	−$2,488.53	2.48
Miscellaneous rent income.....	1,549,755.20	−106,602.75	6.44
Miscellaneous nonoperating physical property	26,364.36	−33,086.29	55.65
Separately operated properties—Profit	6,921.09	+6,921.09	....
Dividend income	*$14,573,844.86	+3,503,037.21	31.64
Income from funded securities—Bonds and notes.....	3,067,839.79	−168,426.95	5.20
Income from funded securities—Investment advances	80,351.68	+4,621.33	6.10
Income from unfunded securities and accounts	716,180.96	+296,495.99	70.65
Income from sinking and other reserve funds	335,679.29	−235,144.60	41.19
Miscellaneous income	181,152.71	+81,221.20	81.28
Total nonoperating income.....	$20,635,954.16	+$3,346,547.70	19.36
Gross income	$26,239,759.86	−$13,036,977.30	33.19
DEDUCTIONS FROM GROSS INCOME			
Rent for leased roads.....	$74,569.19	−$4,926.89	6.20
Miscellaneous rents	776,209.46	−21,065.54	2.64
Miscellaneous tax accruals.....	50,135.62	−6,956.97	12.19
Separately operated properties—Loss	112,203.12	−140,535.10	55.60
Interest on funded debt—Bonds and notes	29,708,350.62	−188,085.03	.63
Interest on funded debt—Nonnegotiable debt to affiliated companies..	237.70	+75.96	46.96
Interest on unfunded debt.....	498,450.25	+264,329.15	112.90
Amortization of discount on funded debt	391,246.59	+15,141.90	4.03
Maintenance of investment organization	27,211.91	−10,514.62	27.87
Miscellaneous income charges.....	380,776.53	−26,436.74	6.49
Total deductions from gross income	$32,019,390.99	−$118,973.88	.37
Net deficit	*$5,779,631.13*	+$12,918,003.42	....
DISPOSITION OF NET INCOME			
Income applied to sinking and other reserve funds	$779,937.26	−$291,132.93	27.18
Income appropriated for investment in physical property.....	17,306.51	−16,290.29	48.49
Total appropriations	$797,243.77	−$307,423.22	27.83
Income balance transferred to debit of profit and loss.....	*$6,576,874.90*	+$12,610,580.20	....

* Excludes all inter-company dividends.

Transportation Operations—Southern Pacific Lines

The following table shows the Net Railway Operating Income and Traffic Statistics of the Transportation System for the year 1932, compared with those for the year 1931:

	Year Ended December 31, 1932	+Increase −Decrease	Per Cent
Average miles of road operated.....	13,713.38	−93.34	.68
NET RAILWAY OPERATING INCOME			
RAILWAY OPERATING REVENUES			
Freight	$105,997,944.21	−$40,634,706.48	27.71
Passenger	21,900,479.86	−11,247,158.53	33.93
Mail and express.....	7,997,378.27	−1,728,382.94	17.77
All other transportation.....	3,590,444.22	−1,316,321.09	26.83
Incidental	3,715,841.13	−1,228,504.53	24.85
Joint facility—Credit.....	133,778.57	−90,280.35	40.29
Joint facility—Debit.....	*738,726.16*	+200,318.56	21.33
Total railway operating revenues.	$142,597,140.10	−$56,045,035.36	28.21
RAILWAY OPERATING EXPENSES			
Maintenance of way and structures..	$16,916,665.72	−$7,744,528.41	31.40
Maintenance of equipment.....	26,470,616.49	−7,708,986.23	22.55
Total maintenance.....	$43,387,282.21	−$15,453,514.64	26.26
Traffic	5,172,992.13	−1,103,378.07	17.58
Transportation	54,688,880.71	−18,380,716.78	25.16
Miscellaneous operations.....	2,588,353.87	−1,080,510.88	29.45
General	9,582,958.26	−796,192.91	7.67
Transportation for investment—Credit	*217,505.81*	+308,725.83	58.67
Total railway operating expenses.	$115,202,961.37	−$36,505,587.45	24.06
Net revenue from railway operations.	$27,394,178.73	−$19,539,447.91	41.63
Railway tax accruals.....	$14,768,413.28	−$2,288,421.63	13.42
Uncollectible railway revenues.....	55,959.04	−5,388.71	8.78
Railway operating income.....	$12,569,806.41	−$17,245,637.57	57.84
Equipment rents—Net.....	6,584,945.65	−823,836.67	11.12
Joint facility rents—Net.....	378,703.95	−63,502.84	14.36
Net railway operating income....	$5,606,156.81	−$16,358,298.06	74.48
TRAFFIC STATISTICS (STEAM RAIL LINES)			
FREIGHT TRAFFIC			
Freight service train-miles.....	17,853,034	−2,642,075	12.89
Tons carried—revenue freight.....	26,822,249	−13,580,710	33.61
Ton-miles—revenue freight.....	8,180,112,387	−2,873,545,280	26.00
Loaded cars per train.....	26.58	−1.82	6.41
Net tons per train—all freight.....	511.50	−80.35	13.58
Revenue per ton-mile—revenue freight	1.248 cents	− .030 cents	2.35
Average distance carried—revenue freight (miles).....	304.97	+31.38	11.47
PASSENGER TRAFFIC			
Passenger service train-miles.....	18,073,354	−3,948,649	17.93
Passengers carried—revenue.....	8,351,190	−1,802,512	17.75
Passenger-miles—revenue	1,021,241,829	−362,457,514	26.19
Passengers per train—revenue passengers	53.69	−6.62	10.98
Passenger revenue per passenger-mile.	1.976 cents	−.265 cents	11.83
Average distance carried—revenue passengers (miles).....	122.29	−13.99	10.27

Due to the serious decrease of activity in all lines of business, and the resulting intensified competition with steamship lines, motor trucks, and other forms of transportation, for the comparatively small amount of traffic moving, the Total Railway

[Advertisement]

Balance Sheet Of Southern Pacific Lines

Southern Pacific Company and Transportation System Companies, December 31, 1932, Compared with December 31, 1931, Excluding Offsetting Accounts

Assets	December 31, 1932	+Increase −Decrease
Investments		
Investment in road and equipment	$1,502,844,545.09	−$14,664,586.81
Improvements on leased railway property	644,987.04	−5,018.22
Sinking funds	6,371,104.39	+380,580.48
Deposits in lieu of mortgaged property sold	188,489.88	−25,421.35
Miscellaneous physical property	3,121,462.62	+23,874.46
Investments in affiliated companies:		
Stocks	396,171,802.94	+24,870,677.00
Bonds	179,894,903.85	+3,755,919.27
Stocks, Bonds } Cost inseparable	59,674,045.52	−105,140.00
Stocks, Bonds, Advances } Cost inseparable	2,249,825.00	.....
Notes	24,245,746.16	+19,747.64
Advances	57,682,770.92	+8,314,025.64
Other investments:		
Stocks	5,254,054.72	−11,490,065.12
Bonds	4,154,151.73	+104,484.47
Notes	511,241.72	−8,179,184.69
Advances	833,463.23	+126,168.94
Miscellaneous	1,539,279.84	−99,578.58
Total	$2,245,381,874.65	+$3,026,483.13
Current Assets		
Cash	$15,505,412.36	−$5,883,659.43
Demand loans and deposits	1,305.00	.....
Time drafts and deposits	.....	−6,000,000.00
Special deposits	43,177.58	−8,909.35
Loans and bills receivable	1,533,355.28	−265,816.90
Traffic and car-service balances receivable	2,763,998.13	+36,648.14
Net balance receivable from agents and conductors	1,232,824.12	−450,722.58
Miscellaneous accounts receivable	3,830,200.34	−970,256.68
Material and supplies	25,064,315.52	−5,652,581.24
Interest and dividends receivable	1,214,028.57	−1,727,272.38
Rents receivable	9,018.83	−5,000.00
Other current assets	5,740,377.85	−1,538,468.20
Total	$56,938,013.58	−$22,466,038.62
Deferred Assets		
Working fund advances	$77,263.87	−$27,284.93
Insurance and other funds	57,310.00	+21,500.00
Other deferred assets	2,480,074.15	+1,407,961.21
Total	$2,614,648.02	+$1,402,176.28
Unadjusted Debits		
Rents and insurance premiums paid in advance	$263,120.61	−$13,250.89
Discount on capital stock	5,959,083.45	.....
Discount on funded debt	12,994,362.10	−390,184.19
Other unadjusted debits	7,905,505.60	+711,838.58
Securities issued or assumed—Unpledged *	11,073,375.00	+8,472,000.00
Securities issued or assumed—Pledged *	99,000.00	.....
Total	$27,122,071.76	+$308,403.50
Grand total	$2,332,056,608.01	−$17,728,975.71

* Excluded from total assets, and corresponding amounts excluded from outstanding funded debt, in accordance with regulations of the Interstate Commerce Commission.

Liabilities	December 31, 1932	+Increase −Decrease
Capital Stock		
Southern Pacific Company	$377,232,405.64	
Transportation System Companies	383,488,220.00	
Total	$760,720,625.64	
Held by the public	$377,248,808.86	+$4,845,243.22
Held within the system	383,471,816.78	+5,356.78
Total stock	$760,720,625.64	+$4,850,600.00
Premium on capital stock of Southern Pacific Company	$6,304,845.00	.....
Total	$767,025,470.64	+$4,850,600.00
Governmental Grants		
Grants in aid of construction	$820,232.40	+$71,917.61
Long Term Debt		
Funded debt unmatured:		
Southern Pacific Company	$326,845,225.00	
Transportation System Companies	494,739,149.33	
Total	$821,584,374.33	
Held by the public	$671,316,016.43	−$8,063,664.01
Held within the system	150,268,357.90	+2,583,250.97
Total funded debt	$821,584,374.33	−$5,480,413.04
Nonnegotiable debt to affiliated companies:		
Open accounts	24,812,066.07	−3,147,779.74
Total	$846,396,440.40	−$8,628,192.78
Current Liabilities		
Loans and bills payable	$7,002,050.00	+$7,002,050.00
Traffic and car-service balances payable	2,385,611.40	−701,447.03
Audited accounts and wages payable	6,523,112.80	−1,643,719.20
Miscellaneous accounts payable	5,359,990.60	−415,117.27
Interest matured unpaid	247,308.67	−23,276.86
Interest payable January 1st	3,430,140.00	−335,030.00
Dividends matured unpaid	8,824.00	−36,344.21
Dividends payable January 1st	.....	−3,723,818.00
Funded debt matured unpaid	45,550.00	−23,970.00
Unmatured interest accrued	6,084,375.10	−1,423,620.25
Unmatured rents accrued	150,135.42	−14,828.33
Other current liabilities	206,275.27	−193,121.29
Total	$31,443,373.26	−$1,532,242.44
Deferred Liabilities		
Liability for provident funds	$466,671.98	+$49,923.98
Other deferred liabilities	483,927.19	−41,962.50
Total	$950,599.17	+$7,961.48
Unadjusted Credits		
Tax liability	$4,528,953.03	−$702,339.15
Insurance and casualty reserves	2,712,274.20	−407,933.78
Accrued depreciation—Road	3,689,491.42	+211,687.95
Accrued depreciation—Equipment	129,759,241.68	−4,282,677.79
Other unadjusted credits	36,359,615.09	−314,210.14
Total	$177,049,575.42	−$5,495,472.91
Corporate Surplus		
Additions to property through income and surplus	$10,895,403.45	+$33,775.39
Funded debt retired through income and surplus	12,196,507.55	+264,797.46
Sinking fund reserves	8,522,591.44	+513,498.62
Appropriated surplus not specifically invested	3,818,177.83	.....
Total appropriated surplus	$35,432,680.27	+$812,071.47
Profit and loss—Balance	472,938,236.45	−$7,815,618.14
Total corporate surplus	$508,370,916.72	−$7,003,546.67
Grand total	$2,332,056,608.01	−$17,728,975.71

Operating Revenues for 1932, amounting to $142,597,140.10, were $56,045,035.36, or 28.21 per cent., less than for 1931, and were the smallest for any year since 1915.

Partially offsetting the decrease in operating revenues was the reduction of $36,505,587.45, or 24.06 per cent, in operating expenses; a decrease of $2,288,421.63, or 13.42 per cent, in taxes; and decreases in equipment and joint facility rents and other charges amounting to $892,728.22, or 11.28 per cent; the net result being a decrease of $16,358,298.06, or 74.48 per cent, in Net Railway Operating Income.

Freight Revenues decreased $40,634,706.48, or 27.71 per cent. Serious inroads have been made on rail traffic by motor trucks; particularly with respect to rice, hay, cotton, citrus fruits, dried fruits, and manufactured products, chief among the latter being petroleum oils and lubricants. In addition to the loss of revenues caused by diversion of traffic from the rails, rate reductions on many commodities, made in efforts to prevent further losses, have, of course, affected your Company's revenues received from the traffic retained. The diversion of freight traffic to motor trucks has been retarded, and an increased amount of traffic was recovered during the year, by the operations of your Company's three subsidiary transport companies.

Passenger Revenues decreased $11,247,158.53, or 33.93 per cent, resulting from the general decline in business and pleasure travel. "Dollar Day" reduced excursion rates were published on several occasions during the year, with a profit, although the volume of such travel also declined from the previous year.

Operating Expenses, as hereinbefore mentioned, decreased $36,505,587.45, or 24.06 per cent. While expenditures both for transportation and maintenance have been greatly curtailed, in view of the reduction in earnings, the service and the facilities of the properties are being maintained in condition to handle the Company's business safely and satisfactorily.

In locomotive fuel performance for 1932, compared with the preceding year there was a further small saving in pounds of fuel consumed per 1,000 gross ton-miles in freight service, but this was more than offset by an increase of 2.30 per cent in passenger service the net result being a loss of $23,607. The increased fuel consumption in passenger service was due, principally, to the elimination of many local trains, requiring more frequent stopping of through trains to do local work; the amount of fuel required to start the through trains being relatively greater than that used in starting the shorter local trains formerly operated. The saving in 1932, compared with 1913, however, was $6,071,540.

[Advertisement]

Railway tax accruals decreased $2,288,421.63, or 13.42 per cent, due to a decrease of $1,205,921.08 in the amount of California gross receipts tax; a decrease of $175,886.38 account Federal income taxes; and a decrease of $906,614.17 in other taxes, the result, principally, of decreased rates and assessments in state, county, and municipal taxes. Notwithstanding a reduction in taxes from $17,056,834.91 in 1931, to $14,768,413.28 in 1932, the 1932 taxes consumed 53.9 per cent of the net revenue from railway operations, compared with 36.3 per cent consumed by the 1931 taxes.

In addition to the reduction of ten per cent in the salaries and wages of all officers and employes, mentioned in last year's report, which was made effective January 1, 1932, as to some of those involved, and effective February 1, 1932, as to the remainder; a further reduction of ten per cent effective August 1, 1932, was made in the salaries of all officers receiving $10,000 or more, per annum. The saving in operating expenses, as the result of these reductions was $7,038,000. The estimate in last year's report of a saving of $9,000,000 from the ten per cent reductions effective at the beginning of 1932, was not fully realized due to later successive decreases in forces. The period of reduction in wages of organized employes covered by local or national agreements was, by negotiation, extended to and including October 31, 1933. The percentage reductions mentioned herein were also applied to the salaries and wages of all officers and employes of the Solely Controlled Affiliated Companies. On April 19, 1933, by order of the Executive Committee, a further reduction of ten per cent effective May 1, 1933, was ordered to be made in salaries of all officers receiving over $4,200, per annum.

Capital Stock—Southern Pacific Lines

The net increase during the year in capital stocks of Southern Pacific Company and Transportation System Companies *held by the public* amounted to $4,845,243.22, due principally to the issue of $4,850,600 of Southern Pacific Company Stock in exchange for St. Louis Southwestern Railway Co. Stock.

Funded Debt—Southern Pacific Lines

The decrease during the year in funded debt of Southern Pacific Company and Transportation System Companies *held by the public* amounted to $8,063,664.01, due principally to equipment trust certificates maturing.

Investment in Road and Equipment—Southern Pacific Lines

The decrease during the year in Investment in Road and Equipment of the Transportation System, amounted to $14,664,586.81, due, principally, to the retirement of rolling stock.

Air Conditioning Equipment for Dining Cars

To provide greater comfort for passengers, fourteen dining cars operating in your Company's San Francisco Overland Limited, Golden State Limited, and Sunset Limited, were equipped with air conditioning units that circulate clean, cool air, or clean, warm air, in these cars, as may be required by the prevailing temperature of the outer air; and were placed in service on June 1, 1932.

St. Louis Southwestern Railway Company

As stated in last year's report, under authority granted by the Interstate Commerce Commission, in its order dated January 12, 1932, and its supplemental order dated March 14, 1932, in Finance Dockets Nos. 8393 and 8970, your Company on April 14, 1932, in addition to the 87,200 shares of preferred stock and the 42,600 shares of common stock which it already owned, purchased, as the result of an agreement entered into in 1930, 59,380 shares of preferred stock and 24,700 shares of common stock of the St. Louis Southwestern Railway Company, and on April 19, 1932, issued 37,459 shares of Southern Pacific Company common stock and paid in cash sums aggregating $1,323.00 in lieu of issuing 98 fractional shares of its stock, in exchange for 37,315 shares of preferred stock and 45,504 shares of common stock of the St. Louis Southwestern Railway Company which had been deposited with the Guaranty Trust Company of New York, under the terms of an offer made on June 16, 1931, to the minority stockholders of the St. Louis Southwestern Railway Company. During the period from April 19, 1932, to December 31, 1932, your Company issued 11,047 additional shares of its common stock and paid in cash further sums aggregating $932.40 in lieu of 69⅕ shares of fractional stock, in exchange for 8,649 shares of preferred stock and 17,780 shares of common stock of the St. Louis Southwestern Railway Company. With these additional acquisitions your Company, therefore, up to the close of business on December 31, 1932, owned an aggregate of 323,128 shares or 87.14 per cent of the 370,797 shares of outstanding common and preferred stocks of the St. Louis Southwestern Railway Company.

Mississippi River Bridge

During the year an agreement was executed between the State of Louisiana, The Public Belt Railroad of the City of New Orleans, and your Company, providing for the construction, by the State and the City jointly, of a railroad and highway bridge over the Mississippi River at New Orleans and for its use, after completion, by your Company and The Public Belt Railroad. A contract was also executed by The Public Belt Railroad and your Company, providing for joint use by your Company of existing trackage of The Public Belt Railroad and of trackage to be constructed by it, over which your Company's trains will operate in connection with the use of the bridge. The Interstate Commerce Commission having approved the arrangements within its jurisdiction, the Reconstruction Finance Corporation agreed to purchase securities of the State of Louisiana, and of the City of New Orleans controlling The Public Belt Railroad, in amounts sufficient to provide funds estimated to be necessary for construction of the bridge and its approaches, and work preliminary to construction is under way. Other railroads may be given equal rights with your Company to use the bridge, but not on more favorable terms. Use of the bridge will require the construction by your Company of a freight terminal at Avondale and will permit abandonment of your Company's train ferries at New Orleans and the present train yard operations at Algiers, all of which is expected to facilitate and improve train operation.

Store-Door Pick-Up and Delivery Freight Service

The volume of traffic secured by the Pacific Motor Transport Company increased 43.42 per cent. over that for the year 1931. Intrastate operations were extended so that this service is now available to most of the communities served by your Lines in California, Oregon, Arizona, and Nevada.

In addition to the three reported last year, Pacific Motor Transport Company secured from the California Railroad Commission three new highway truck operating rights, two of which were alternate route extensions that permitted the Transport Company to effect savings in operating time and expenses.

Under an arrangement with the Southern Pacific Company, Pacific Motor Transport Company furnishes on a cost plus basis motor truck service wherever needed and desired by your Company, and between a number of points highway truck service has been substituted for steam train service, providing earlier freight deliveries and permitting your Company to effect substantial savings in rail operating expenses.

Much of the competitive traffic handled by the Transport Company has been taken from competing motor trucks.

Considerable progress was made in Texas by the Southern Pacific Transport Company in securing new patrons; but the volume of traffic decreased due to general business conditions, and the growing tendency of wholesale houses to extend their own truck deliveries into wider areas. Operations were also affected by lack of enforcement of motor carrier laws enacted by the 42nd Texas Legislature (1931), this condition growing out of court injunctions granted in many cases brought to motor truck operators competing with the Transport Company. It is believed that the decision rendered by the United States Supreme Court December 5, 1932, upholding the validity of the Texas truck laws, will substantially eliminate local court interferences heretofore prevailing.

As stated in last year's report, the Southern Pacific Transport Company of Louisiana was incorporated, and commenced operations on April 16, 1932. The service was immediately popular and has been extended into all districts served by your Lines in Louisiana. In addition to store-door pick-up and delivery service, the Transport Company secured authority of the Louisiana Public Service Commission for operation of motor trucks upon a total of 1,836 miles of highway, and through coordination of the Transport Company's truck service (operated under contract) with rail operations, your Company has been enabled to reduce branch line train service, thus effecting reductions of about 200,000 train-miles a year with resultant operating savings of approximately $100,000 annually. The new service has fully met expectations in effecting rail operating savings, and is recovering traffic previously lost to highway and waterway carriers.

The total charges to the public for the year 1932 for transportation of shipments handled via rail and truck under the jurisdiction of the three Transport Companies mentioned above, were $2,835,489.65, and were $636,756.66, or 28.96 per cent., more than for the two Transport Companies operating in 1931.

Pacific Greyhound Corporation and Southland Greyhound Lines

Independently Operated Bus Lines in Which Southern Pacific Owns About a One-Third Interest

Pacific Greyhound Corporation and subsidiaries operating most of the important motor bus lines on the Pacific Coast south of Portland and west of Salt Lake City, Utah, and El Paso, Texas, earned net income of $412,960.31 for the year; an increase of $29,996.14, or 7.83 per cent., compared with the net income for year 1931. This favorable result was accomplished during a

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period of falling gross revenues by reducing service as traffic diminished, disposing of equipment not required, thus saving depreciation and maintenance charges, and by obtaining a full year's benefit of lower wage scales made effective in November, 1931.

"Nitecoach" service, using buses with sleeping accommodations, was established between San Francisco and Los Angeles via Coast and Valley routes, and between San Francisco and Medford, Oregon.

Southland Greyhound Lines, Inc. and subsidiaries, operating most of the important motor bus lines in Texas, had a net loss of $143,244.57 for the year, compared with loss of $126,648.97 for 1931. Substantial reductions were made in service and operating expenses but the savings were more than offset by falling off in revenues.

General Traffic Conditions

The reduction in traffic handled by your Lines during the past year, resulting from the general decline in business activity, is fully dealt with in the remarks concerning Transportation Operations. The year 1933 commenced with business activity at the lowest level for many years and the early months of this year have shown no improvement in the trend of traffic. The outlook for 1933 is still so obscure as to preclude any reliable forecast. However, crop indications are good and merchandise stocks are low, so that any improvement in purchasing power or demand should be quickly reflected in increased traffic.

The methods discussed in last year's report to recover some of the traffic lost to motor truck competitors have been continued and augmented as explained in the comments on Store-Door Pick-Up and Delivery Freight Service. There is a growing sentiment to regulate motor truck operations so as to bring about a more equitable basis of competition with other forms of transportation that are now subject to governmental regulation, and this sentiment is being translated into legislation designed to accomplish this result in various states through which your Lines operate. In Oregon, Utah, New Mexico, and Texas, laws regulating motor truck operations have been enacted, and there is a fair chance for similar legislation in the states of Nevada and increased regulation in California.

There were located on the rails of the Southern Pacific Lines, during the year, 601 new industries, and 33 industries left these rails through removal to other locations, abandonments of the enterprises, or through mergers with other companies. Most of the newly located industries were of small or moderate size. Construction of the United States Naval Air Base at Sunnyvale, California, continued during the year, and some further units were added to the United States Army Base (Benton Field) at Alameda, California.

Extension of Steamship Service to Boston

Effective with the sailing from Houston on April 6, 1932, and from Galveston on April 7, 1932, your Company's Houston-Galveston-Baltimore steamship freight service was extended to include Boston, Massachusetts, as a port of call on the northbound trip. The Boston service with two steamships in the line proved to be popular from the start and has been amply justified by the resultant volume of traffic and revenues. A third steamship was placed in service in this line early in 1933 to provide more frequent sailings.

General

In view of the severe decline in revenues, no dividends were declared during the year 1932 on the capital stock of Southern Pacific Company. Dividends paid for the year 1931 aggregated $20,480,999.00, and were at the rate of $5.50 a share; instead of at the rate of $6.00 a share, which had been maintained continuously for many years.

By order of the Board of Directors,
HALE HOLDEN,
Chairman.

[Advertisement]

News (Financial)

(*Continued from page 645*)

PENNSYLVANIA.—*Trackage Rights.*—This company has applied to the Interstate Commerce Commission for authority to operate under trackage rights over the Mahoning State Line, which is leased to the Pittsburg & Lake Erie, between Walford, Pa., and Hillsville, 12 miles.

RICHMOND, FREDERICKSBURG & POTOMAC.—*Annual Report.*—The 1932 annual report of this company shows net income after interest and other charges of $389,341, as compared with net income of $937,873 in 1931. Selected items from the Income Statement follow:

	1932	Increase or Decrease
RAILWAY OPERATING REVENUES	$6,306,559	−$2,608,686
Maintenance of way	564,305	−339,150
Maintenance of equipment	1,266,400	−466,190
Transportation	2,511,898	−789,082
TOTAL OPERATING EXPENSES	4,931,939	−1,745,256
Operating ratio	78.20	+3.30
NET REVENUE FROM OPERATIONS	1,374,620	−863,430
Railway tax accruals	324,011	−108,552
Railway operating income	1,050,412	−754,197
Hire of equipment, Dr.	393,098	−158,033
Joint facility rent, Dr.	90,059	+7,323
NET RAILWAY OPERATING INCOME	564,255	−603,487
Non-operating income	167,327	−7,945
GROSS INCOME	731,582	−611,432
Interest on funded debt	328,235	−5,622
TOTAL DEDUCTIONS FROM GROSS INCOME	342,241	−62,900
NET INCOME	389,341	−548,532

RED RIVER & GULF.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon operation over its line from Louisiana Junction to Cocodre, La., 6.95 miles.

SANTA FE NORTHWESTERN.—*R. F. C. Loan.*—Division 4 of the Interstate Commerce Commission has denied this company's supplemental application for a loan of $100,000 from the Reconstruction Finance Corporation. It had previously denied an application for a loan of $228,824.

SOUTHERN PACIFIC.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon operation on 16 miles of its Santa Rosa branch and 2 miles of its Wingo-Union branch in California, parts of which are to be operated by the Northwestern Pacific.

SOUTHERN PACIFIC.—*Bonds.*—The Interstate Commerce Commission has authorized this company to issue $1,074,000 of first refunding mortgage bonds in reimbursement of expenditures for the retirement of an underlying issue, the bonds to be sold at not less than par and the proceeds applied on the railroad company's open account indebtedness to the Southern Pacific Company, which latter is authorized to use the bonds as collateral security for notes.

TEXAS & PACIFIC.—*Annual Report.*—The 1932 annual report of this company shows net income after interest and other charges of $92,710, as compared with net income of $2,041,858 in 1931. Selected items from the Income Statement follow:

	1932	1931	Increase or Decrease
RAILWAY OPERATING REVENUES	$21,339,398	$30,007,959	−$8,668,561
Maintenance of way	2,046,834	3,647,693	−1,600,859
Maintenance of equipment	3,794,637	4,954,847	−1,160,210
Transportation	6,727,261	9,519,389	−2,792,128
TOTAL OPERATING EXPENSES	14,869,530	20,614,631	−5,745,100
Operating ratio	69.68	68.70	+.98
NET REVENUE FROM OPERATIONS	6,469,868	9,393,329	−2,923,461
Railway operating income	5,257,749	7,879,608	−2,621,859
Hire of freight cars—Dr.	1,383,936	2,028,260	−644,324
Joint facility rents	51,488	64,807	−13,319
NET RAILWAY OPERATING INCOME	3,871,848	5,870,317	−1,998,469
Non-operating income	512,408	540,125	−27,717
GROSS INCOME	4,384,257	6,410,442	−2,026,186
Interest on funded debt	4,211,242	4,238,555	−27,313
TOTAL DEDUCTIONS FROM GROSS INCOME	4,291,546	4,368,585	−77,038
NET INCOME	$92,710	$2,041,858	−$1,949,147

Average Prices of Stocks and of Bonds

	Apr. 25	Last week	Last year
Average price of 20 representative railway stocks..	28.32	24.36	20.53
Average price of 20 representative railway bonds..	56.41	53.18	61.02

Dividends Declared

Dallas Railway & Terminal Company.—7 Per Cent Preferred, 1¾ per cent, payable May 1 to holders of record April 20.

Elmira & Williamsport.—$1.15, semi-annually, payable May 1 to holders of record April 20.

Nashua & Lowell.—$4.00, semi-annually payable May 1 to holders of record April 15.

Norfolk & Western.—Common.—$2.00, quarterly, payable June 19 to holders of record May 31.

Ontario & Quebec.—Debenture, 2½ per cent, semi-annually; Semi-annual, $3.00, both payable June 1 to holders of record May 1.

York Railways.—Preferred, 62½c, quarterly, payable April 22 to holders of record April 20.

Railway Officers

EXECUTIVE

H. G. Powell, general traffic manager of the Illinois Terminal, with headquarters at St. Louis, Mo., has been promoted to vice-president in charge of traffic, with the same duties as heretofore.

The office of chairman of the board of directors of the Boston & Maine was discontinued by the board at a meeting on April 25, but **Thomas Nelson Perkins,** who had held the office since April, 1930. will continue, as a member of the board of directors and of the executive committee. Mr. Perkins has been associated with the Boston & Maine since 1924, serving as a member of the board. chairman of the executive committee. acting president, and as chairman of the board.

OPERATING

Leonard P. Schooler, a dispatcher on the Louisville division of the Louisville & Nashville, has been appointed temporary night trainmaster of the Cincinnati Union Terminal, Cincinnati, Ohio.

G. C. Kennedy, superintendent of the Kingsville division of the Gulf Coast Lines, with headquarters at Kingsville, Tex., has had his jurisdiction extended to include the DeQuincy division. **L. A. Gregory,** superintendent of the DeQuincy division, has been appointed to the newly-created position of assistant superintendent, with headquarters as before at DeQuincy, La. **J. W. Marshall,** trainmaster on the DeQuincy division, has been transferred to the Kingsville division, with headquarters at Kingsville, to succeed **H. P. Holzmann,** who has been transferred.

Following a rearrangement of divisions on the Chicago, Rock Island & Pacific, the Pan Handle-Indian Territory division and the Oklahoma-Southern division were abolished and the Oklahoma and Southern divisions were formed. **Kepler Johnson,** superintendent of the Oklahoma-Southern division, with headquarters at Fort Worth, Tex., has been appointed superintendent of the Oklahoma division, with headquarters at El Reno, Okla. **D. Van Hecke,** superintendent of the Pan Handle-Indian Territory division, with headquarters at El Reno, has retired. **A. B. Warner,** vice-president of the Chicago, Rock Island & Gulf (which consists of the new Southern division of the C. R. I. & P.), with headquarters at El Reno, Okla., has been appointed also general superintendent, with headquarters at Ft. Worth, Tex.

ENGINEERING AND SIGNALING

T. C. McCord, division engineer of the Kingsville division of the Gulf Coast Lines, with headquarters at Kingsville, Tex., has had his jurisdiction extended to include the DeQuincy division. **C. S. Colvin,** division engineer of the DeQuincy division, with headquarters at DeQuincy, La., has been appointed supervisor of bridges and buildings of the Kingsville and DeQuincy divisions, with headquarters at Kingsville.

C. Feucht, roadmaster on the Union Pacific, with headquarters at Salina, Kan., has been promoted to the newly-created position of general roadmaster, with headquarters at Kansas City, Mo. **O. C. Wilkes** has been reappointed general roadmaster at Omaha, Neb., this position having been abolished in January. **W. C. Perkins,** formerly a division engineer on the Oregon Short Line (part of the Union Pacific System), has been appointed to the newly-created position of general roadmaster at Pocatello, Idaho.

Following an adjustment of divisions on the Chicago, Rock Island & Pacific, in which the Pan Handle-Indian Territory division and the Oklahoma-Southern division were rearranged to form the Oklahoma and Southern divisions, **C. A. Richards,** division engineer of the Pan Handle-Indian Territory division, was appointed division engineer of the new Oklahoma division, with headquarters as before at El Reno, Okla. **S. L. McClanahan,** division engineer of the Oklahoma-Southern division, has been appointed division engineer of the new Southern division, with headquarters as before at Ft. Worth, Tex. Mr. McClanahan has also assumed the duties of roadmaster and master carpenter on the Southern division.

MECHANICAL

F. R. Hosack, master mechanic of the Kingsville division of the Gulf Coast Lines, with headquarters at Kingsville, Tex., has had his jurisdiction extended to include the DeQuincy division. **L. L. Allen,** master mechanic of the DeQuincy division, with headquarters at DeQuincy, La., has been appointed assistant master mechanic, with the same headquarters.

Douglas M. Burckett, electrical engineer in the engineering department of the Boston & Maine, has been appointed also electrical engineer, mechanical department, which position was formerly held by the late **Louis C. Winship.** Mr. Burckett was born in Boston, Mass., December 18, 1895, and was educated at the Massachusetts Institute of Technology, graduating with the degrees of S.B. and M.S. in 1922. Following two years service in the World War, Mr. Burckett entered railroad service in 1926, as assistant engineer, Great Northern, with headquarters at Seattle, Wash. He was later appointed assistant electrical engineer, and since October, 1929, he has been connected with the Boston & Maine as electrical engineer in the engineering department.

OBITUARY

L. W. Gent, general agent for the Minneapolis, Northfield & Southern, with headquarters at Tulsa, Okla., died in that city on April 9.

Robert B. Scofield, who retired 12 years ago as assistant secretary and assistant treasurer of the Delaware, Lackawanna & Western, died on April 23, at his home in Brooklyn, N. Y.

Alfred J. Davidson, who retired from active service in January as general manager of the Spokane, Portland & Seattle, and who was formerly president of the St. Louis-San Francisco, died on April 15, at his home in Portland, Ore. Mr. Davidson's official retirement under the pension rules of the company took place on April 14, the day before his death, when he was presented with a silver plaque by a group of his official associates on the S. P. & S. Mr. Davidson was born on April 14, 1863, at Decatur, Ill., and after a public school education he entered railway service in 1884 as a station baggage master on the Chicago & Alton (now the Alton), later serving as a night operator, day operator

Alfred J. Davidson

and station agent. In 1884, he left this road to go with what is now the St. Louis Southwestern as foreman of the transfer platform at Bird's Point, Mo. Later Mr. Davidson served in various clerical positions with this company until 1888, when he was appointed chief train dispatcher of the San Antonio & Arkansas Pass (now part of the Southern Pacific) at San Antonio, Tex., later serving as a trainmaster with this company. In 1893 he entered the service of the Gulf, Colorado & Santa Fe, as superintendent of the Northern division at Ft. Worth, Tex., where he remained until 1898 when he went with the St. Louis-San Francisco as superintendent of transportation at St. Louis, Mo. Three years later Mr. Davidson was advanced to general superintendent and in April, 1904, he was elected president of the Frisco, the Chicago & Eastern Illinois and the Evansville & Terre Haute, the two latter roads being under the control of the Frisco at that time. In December, 1909, Mr. Davidson retired from railway service and went west where he again took up railway work in January, 1914, as superintendent of the Portland division of the Spokane, Portland & Seattle. In January 1917, he was advanced to general superintendent at Portland and in 1920 he was made general manager, the position he held until his death.

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The NEW "AB" FREIGHT BRAKE

IS FAST - POSITIVE - EFFECTIVE

THIS new brake is so designed that serial service action on a train is twice as fast as heretofore possible, because each individual valve acts quicker . . . This action is positive because the valve is so designed that once the local vent is started it will continue until a complete movement to service position is accomplished . . . Moreover, the brake cylinder pressure obtained from quick service action, which will always reach the predetermined amount, regardless of piston travel, is sufficient to produce an appreciable retardation of the train. This feature in conjunction with fast propagation assures an effectiveness of slack control heretofore unrealized . . . Thus trains can be handled with greater smoothness, flexibility, and safety.

This advertisement is No. 2 of a series

WESTINGHOUSE AIR BRAKE CO.

GENERAL OFFICE *and* WORKS

WILMERDING, PA.

CONVERTING DOUBLE TRACK TO SINGLE TRACK

(Making One Track Do the Work of Two)

THE American Railway Engineering Association through its Committee on the Economics of Railway Operation at the annual meeting last year presented a comprehensive report on converting double track to single track. The conclusion of the report was:

> **"Where the volume and distribution of traffic on a double track line had decreased enough to warrant a reduction in facilities, the converting of double track into single track should be considered."**

This report gave the result of a study of the effect of removing 25 miles of track on a 63 mile section of road where traffic volume had been reduced nearly 50 per cent. The report included the original and the proposed track plans and estimates of the cost of and the saving to be effected by converting double track to single track. Since this report was made, the section of the road covered by the study has been converted to single track.

A much more extensive double track conversion has recently been carried out by an important western railway, changing over 205 miles of double track road to single track operation.

The principal purpose of this change was to effect a saving in track maintenance of approximately $1000 per mile per year or a total annual saving of $205,000.*

*A report covering this installation will be presented by Committee I, Economics of Railway Signaling, at the annual meeting of the American Railway Association Signal Section, May 9 and 10.

UNION SWITCH & SIGNAL COMPANY
Swissvale, Pennsylvania

GENERAL RAILWAY SIGNAL COMPANY
Rochester, N. Y.

85a

Signals Aid Modern Motive Power to Produce More Ton-Miles Per Train-Hour